Smithsonian

August 1983

Manteo marionettes:
valiant knights of
wood and metal (p. 68)

COPENHAGEN PORCELAIN
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If you could journey around the world on a quest for fine porcelain, you could not acquire these especially desirable pieces. For each of these cups and saucers will be available only in this collection, and only from the Danbury Mint.

A collection rich in history and tradition.

The cups and saucers will vary in appearance, and the collection will have exciting diversity. Each maker will combine a particular shape, size, finish, and decorative motif in a way that is completely characteristic of its time-honored traditions and yet somehow different from anything ever done before.

Wedgwood® will produce a cup and saucer in its beautiful Blue Jasper Ware, which Josiah Wedgwood himself invented in 1774.

Bing & Grondahl, of Denmark, will produce a cup and saucer with its renowned blue underglazing and hand-painted motif. Haviland, of Limoges, France, has chosen a pattern and shape nearly identical to the combination which won a medal for beauty at the 1900

Shown at left are the hallmarks from some of the porcelain houses represented in the collection.

This elegant wood display cabinet, specially designed to show the complete collection, will be furnished at no extra charge.

Paris World's Fair. Rosenthal, of West Germany, has gone back to the 18th century for its lavishly ornate cup.

Royal Doulton, Royal Worcester, Spode and Aynsley, all of England, and Royal Tara, of Ireland, will each produce a cup and saucer in fine bone china – known for its strength, lightness, and remarkable translucence.

Noritake, of Japan, will produce an exquisite cup and saucer adorned with flowers outlined in 24kt gold. Pickard, of the United States, will make a cup and saucer the same shape as those in a service used by the Secretary General of the United Nations (the pattern will be different, however, in keeping with the exclusivity of this collection).

Each cup and saucer will be hallmarked with the special identifying mark of its maker, and each will be accompanied by a Certificate of Authenticity, bearing the signature of an executive of the particular porcelain house and stating that the cup and saucer are of unique design, created solely for this landmark collection.

A magnificent wood display cabinet– no added cost.

Each collector will receive a magnificent wood wall cabinet to display the entire collection to best advantage. Each cup and saucer will have its own space, highlighted by elegant columns. There will be special grooves in the shelves so that each saucer can stand securely behind each cup, in full and splendid view. The cabinet will be hand-stained and will come pre-assembled, ready to hang.

A very favorable price . . . a convenient acquisition plan.

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No payment is needed now. Simply complete the reservation application and return it promptly. You will receive your cups and saucers at the convenient rate of one set every month, and you will be billed separately for each shipment. As a further convenience, you may have each cup and saucer charged, as shipped, to your VISA or MasterCard.

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In the unlikely event you receive a cup and saucer you are not delighted with, you may return them within 30 days for replacement or refund. You may cancel your subscription at any time.

The cups and saucers will add charm and beauty to your home for generations to come; they will add interest, grace, and dignity to special occasions. To be among the fortunate few who own them, please send us your reservation now. This is an opportunity not to be missed!

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Cups and saucers shown much smaller than actual size.

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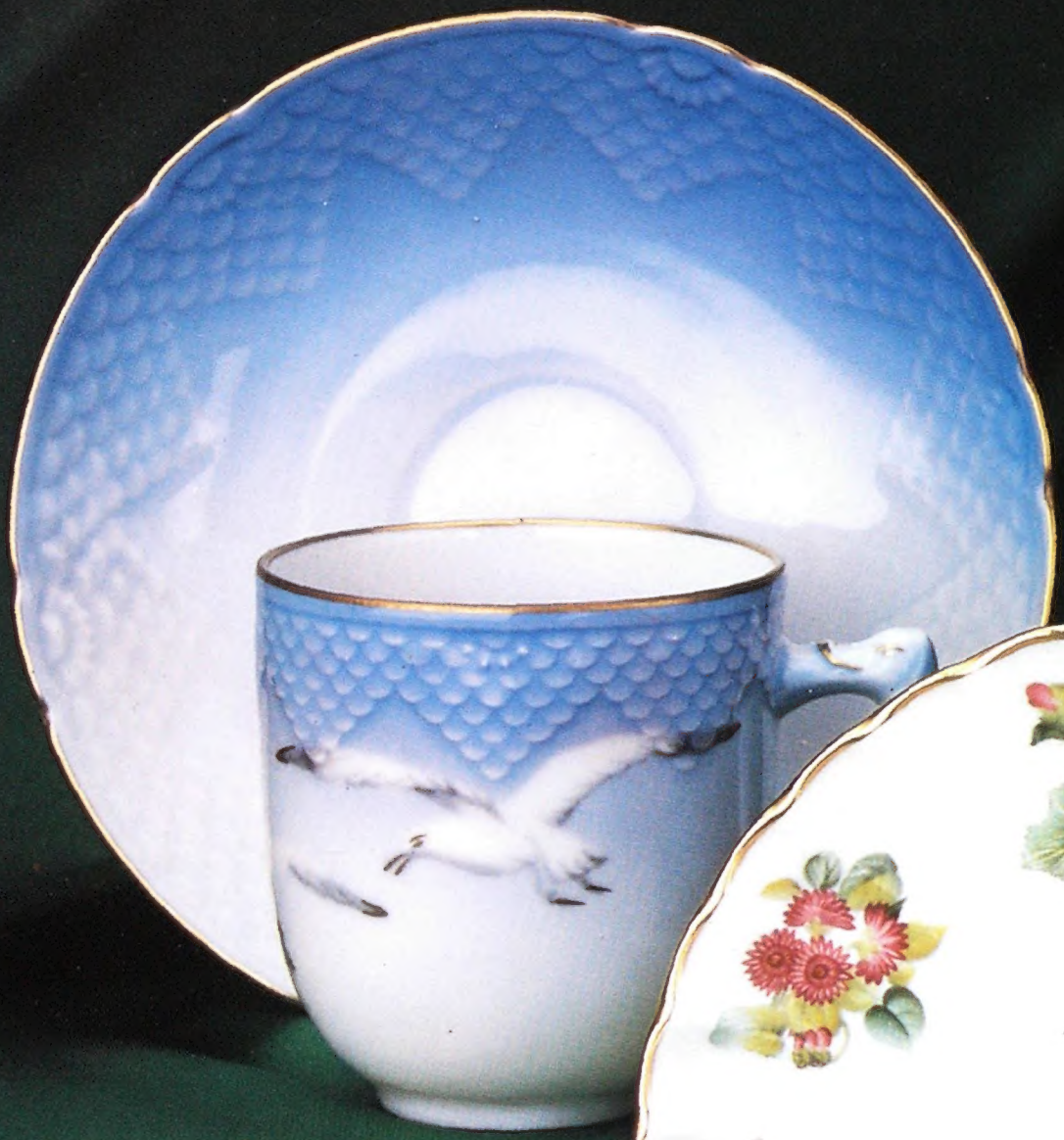

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Cups and saucers shown actual size.

August 1983

Smithsonian

Volume 14, Number 5

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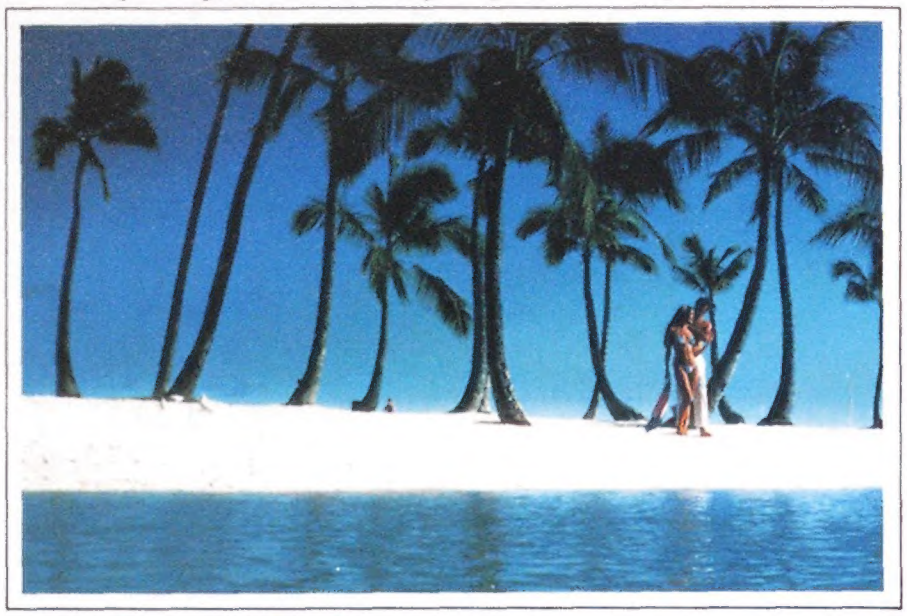

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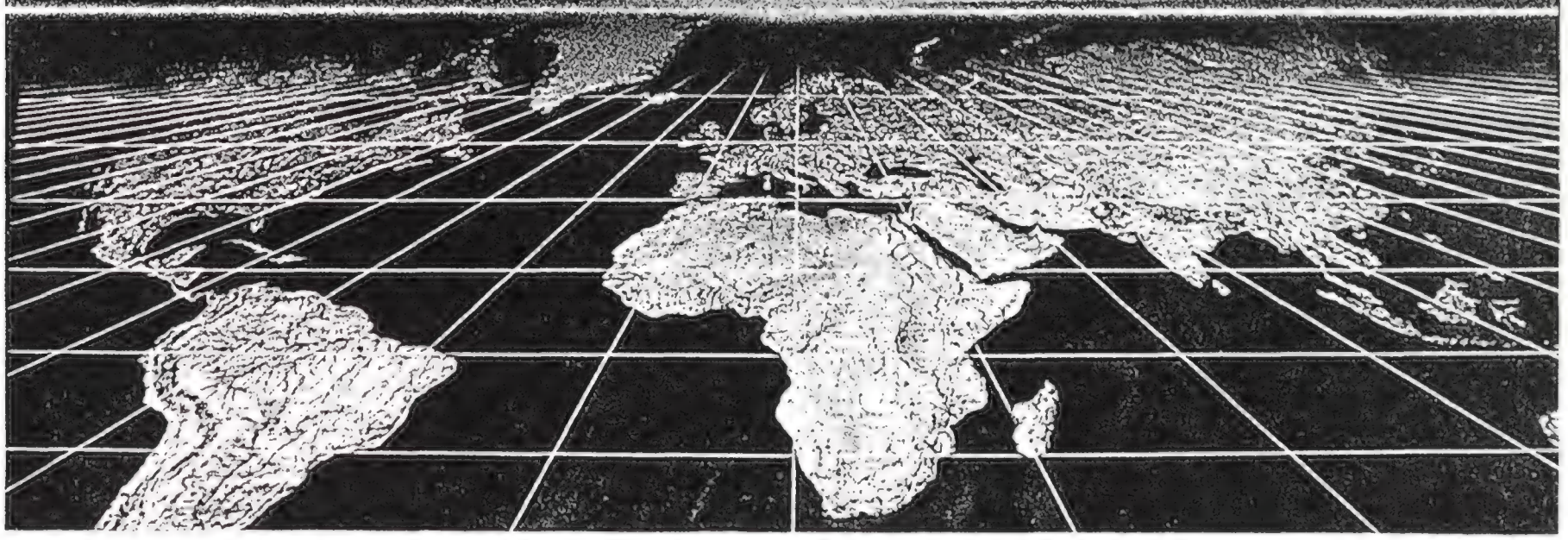

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The view from the castle

Thinking of handing on the reins next year, I look back *with gratitude and* ahead *with confidence in the future of the Smithsonian*

This coming February I shall have had the opportunity of helping to guide the Smithsonian Institution for 20 years. As an appointee of its Board of Regents, it has been my privilege to remind Americans that this unique Institution belongs to them, indeed to all mankind, as a remarkable trust for which our government has consistently pledged support. On our part, we must justify that support and the public's confidence by vigilance in the pursuit of truth in science, art and history.

And so 1984 seems a good year to hand over the reins, with the full concurrence of the Regents, in the assurance that the tenor of our ways will be preserved as in the past with the support of Congress and the Presidency and with the loyal efforts of our staff.

Now, above all, we must count on our Associates. I have found their interests never-ending, and have relished every bit of their understanding and concern for the Institution's welfare. They have helped immeasurably in explaining what the Smithsonian is all about, while at the same time satisfying their own curiosity about the world at large.

Thus it is with nostalgia and some regret that I envisage parting with you in September 1984 to become Secretary Emeritus. As such, I shall not leave entirely. Like my predecessors, I shall continue to be about the place working on my own research and on field trips abroad.

These 20 years have been glorious ones for us all. Most of the realized needs of the Institution have been filled: a new museum of contemporary art, the Hirshhorn Museum and Sculpture Garden; a National Portrait Gallery, foreseen many years before; an expanded Museum of American Art, coupled with the unique resources of the Archives of American Art; the Cooper-Hewitt—the National Museum of Design in New York—and its parallel museum in Washington, the Renwick; a recognition of the importance of folklife traditions and ethnic roots; and of course enlarged activities in environmental studies, tropical research and conservation; and, withal, expanded programs in teaching and guided studies. New buildings, such as the recent epochal development of the Museum Support Center, seem to have taken an average of ten years to achieve. But some have come in ahead of time, in particular the National Air and Space Museum, most popular museum in the world.

All of these and more have been realized. There is one more task to be completed, in itself a project of complexity and novelty, described in these pages in February 1983. This is the Quadrangle, so-called, the Center for African, Near Eastern and Asian Cultures now beginning on the Mall. The response of the Associates has been the most rewarding accomplishment of my time, along with the creation of this magazine itself. Over $3.5 million of our construction funds have poured in from all of you, along with major gifts from donors convinced of the future of this project and its programs. I hope to see the project completed with the vitality, imagination and style that it needs, so that all of you may be satisfied that we have indeed done our best to promote "the increase & diffusion of Knowledge among men."

S. Dillon Ripley

A moment with a Mustang GT.

Mustang GT approaches S turn. Downshift 4th to 3rd gear. Driver brakes (ventilated power front discs, rear drums). Five liter high-output V-8 in third gear.

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Letters to the Editor

Mermaids

Dear Sir: Your June article brought to mind a greeting card we received last Christmas from Thailand, with a mermaid on the front [below]. Surprised that what I had always deemed a bit of Western mythology extended to the Far East, I asked a Thai co-worker about it, and she told me their legend. It seems that a very beautiful mermaid lived beneath the sea with her parents. She was desired ardently by a terrestrial king, but her father forbade her to swim to the surface. At last she defied him, married the king and they lived happily ever after.
Lilith
San Francisco

Dear Sir: One renowned mer-person of antiquity was Dagon, a Philistine god of crop fertility who had the head and arms of a man and the body and tail of a fish.

A temple dedicated to him was the one Samson pulled down to destroy his Philistine captors and himself: "Then the lords of the Philistines gathered them together for to offer a great sacrifice unto Dagon their god, and to rejoice: for they said, Our god hath delivered Samson our enemy into our hand" (*Judges* 16:23).
Richard L. Jeffries
Dallas

Dear Sir: There is a difference between a child seeing a painting such as appears on your June cover in a museum for a few minutes and having it appear in the home—where lessons of modesty are still being taught to young minds—on what usually can be considered a family magazine. Poor taste, Sirs.
Mrs. Betty Markovchick
Falls Church, Virginia

Dear Sir: Before the clean-up squad gets started on you, congratulations—it is a lovely cover picture.
John Welsh
Ferndale, Washington

Mosquitoes

Dear Sir: We in Florida are blessed with a number of mosquito varieties which, in their own musical ways and hungry habits, disturb visitors and residents alike.

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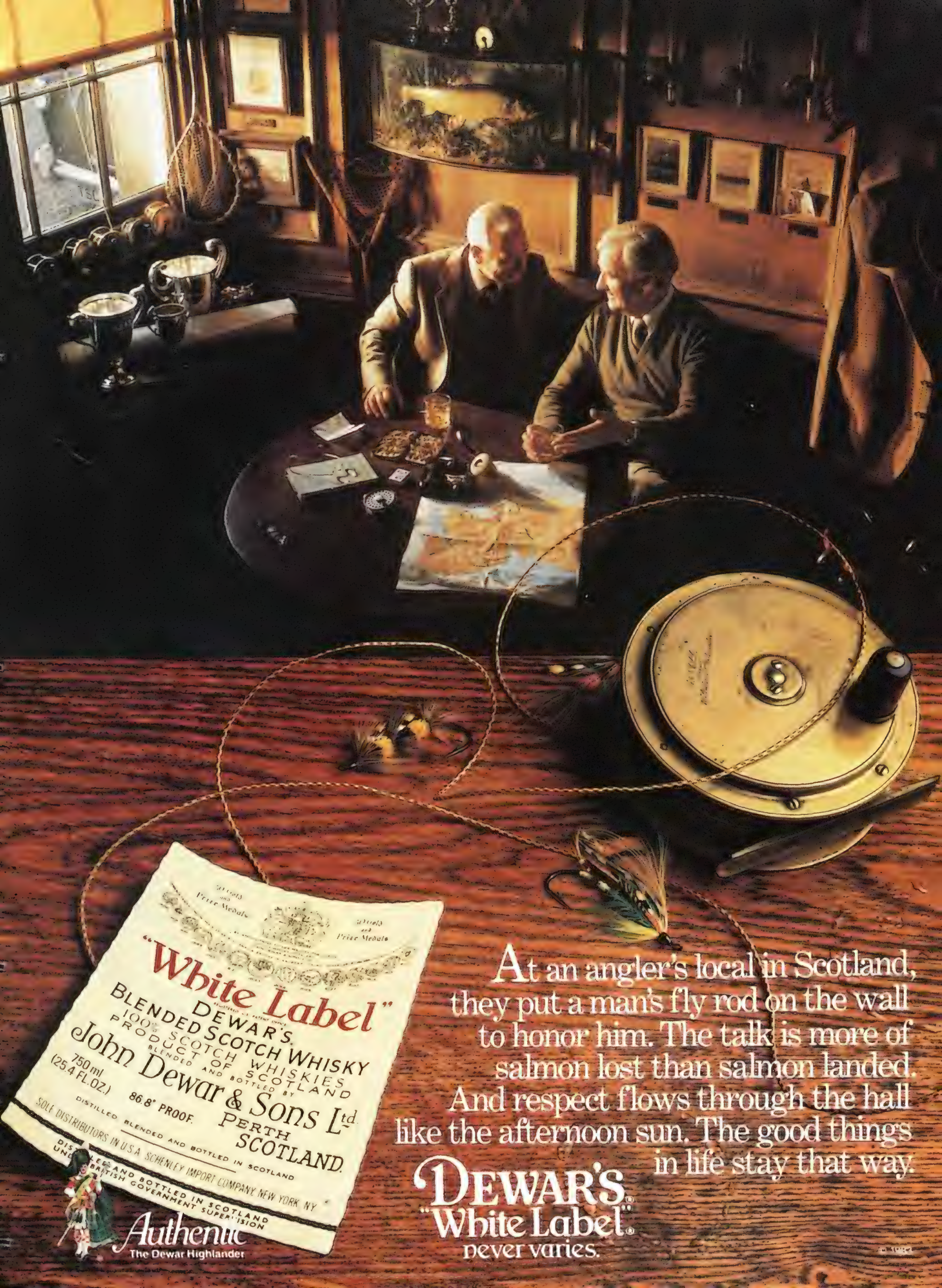
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other residents of this marsh—not to mention nearby human beings.

We have to contend with our inshore coastal waters being damaged by runoff of agricultural nutrients and pesticides, human-waste pollution and repeated industrial spills—and you picture one more form of damage inflicted on a most unfortunate area: tidal marshes.
Paul F. Rhinesmith
Dade City, Florida

Dear Sir: My husband's secret for keeping summer bugs at bay: eat garlic every day.
Susan Chern
Staten Island

Dear Sir: There are two exciting developments that add a promising postscript:

Towns in Maine are buying dragonflies by the thousands and releasing them to feed on mosquitoes, following the eight-year lead of the town of Wells, where results have been excellent. Dragonfly nymphs prey on mosquito larvae underwater, and dragonfly adults catch mosquitoes in the air. And the New York City Health Department is spraying 4,000 swampy acres with harmless bacteria that kill only mosquito larvae.

Outlawing chemical pesticides which destroy beneficial organisms and increase future pest outbreaks would also help prevent much of the toxic-waste problem.
Ernestine Norsgaard
Lakeville, Connecticut

Ned Kelly

Dear Sir: Somehow, the tale seemed familiar. Ah, yes—America had her own "folk hero" in Jesse James, the real-life hero of paperback "dime novels" which flourished in the early years of this century. I was reading them circa 1904.

Jesse and his gang robbed banks and trains and killed people throughout the Midwest. Finally, in 1879, Governor Thomas T. Crittenden of Missouri offered a dead-or-alive reward for Jesse. Temptation proved too great for one of his gang, who shot Jesse to death. Several of his henchmen met violent ends as well. It's an interesting corollary to the Kelly story.
Louis F. Cahn
Baltimore

Dear Sir: Gavin Souter's article dishonors both Australia and Ireland by its failure to mention Jack Duggan, hero of the

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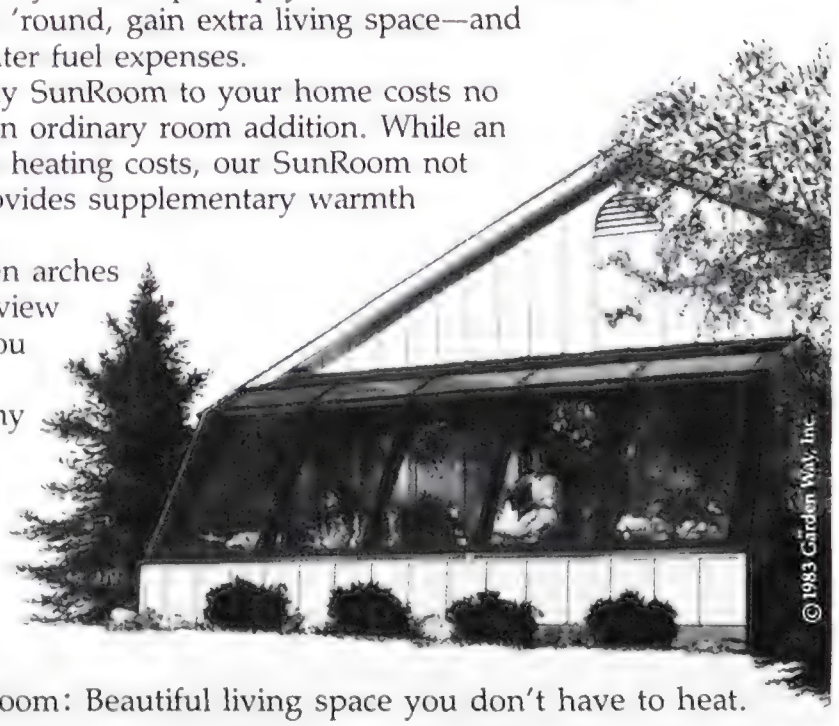

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Aussie/Irish song, "The Wild Colonial Boy." Show me an Aussie who doesn't know that tune in whole or in part and I'll show you a female 'roo without a pouch! Up the Irish!
Howard Karp
Baldwin, New York
Jack Doolen (also Donovan, or Dowling, or Duggan, or Dolan, or Davis, or Dollard), was indeed the outlaw hero of "The Wild Colonial Boy," *but it is not certain that he really existed.* Ed.

Theater restoration

Dear Sir: We in Marietta read Tom Prideaux's article with a mixture of envy and pride—mild envy because our own floating renovation, *Becky Thatcher*, was not included, but pride because we find ourselves in such good company.

We are situated at the confluence of the Ohio and Muskingum Rivers, and so in 1975 we decided on a Bicentennial project to emphasize our river heritage. A group of citizens formed a nonprofit corporation and located an old Corps of Engineers VIP boat, which had been converted into a St. Louis restaurant and river-lore museum. Towed 1,080 miles up the Mississippi and Ohio, she was moored in the Muskingum and renovated into a theater featuring "authentic 19th-century showboat melodrama" with olio between the acts—as in the days of Mark Twain, creator of the original character, Becky, for whom the boat was named.
Janet R. Herman, Executive Director
Ohio Showboat Drama, Inc.
Marietta, Ohio

Dear Sir: Your article may well have the beneficial effect of spreading the idea to other communities. However, author Prideaux missed one prime example: the conversion, over a decade ago, of the once-beautiful but then run-down old Loew's-Penn Theater in downtown Pittsburgh. It is now Heinz Hall for the Performing Arts and the home of the Pittsburgh Symphony as well as host to many other organizations and visiting artists.
Robert G. Brust
Verona, Pennsylvania

Dear Sir: I would like to bring to your attention the Maryland Theatre in Hagerstown, first opened in 1915 and, surprisingly, designed by the same man who did the Ohio Theater. The Mary-

land was partially destroyed by fire in 1972; restoration and renovation began in 1977 and is continuing. Today, glowing with most of her original beauty, she is again providing top-notch live entertainment to the people of our area.
Sandra K. Roof
Cavetown, Maryland

French caves

Dear Sir: Les Daly's article presents a great idea for combining the past and present. Children growing up in such an environment would gain a sense of history from the geological and anthropological findings and at the same time enjoy the benefits of the most modern air-circulation, electric, plumbing and even solar equipment. The combination of both worlds seems rich for learning.
Heather A. Dumas
Miami, Florida

Jackson Laboratories

Dear Sir: In your May issue you identified Howard Temin, Nobel Prize winner, as a University of Michigan molecular biologist. His work was done at the University of Wisconsin; he is still on our faculty.
Dorothy Knaplund
Madison, Wisconsin

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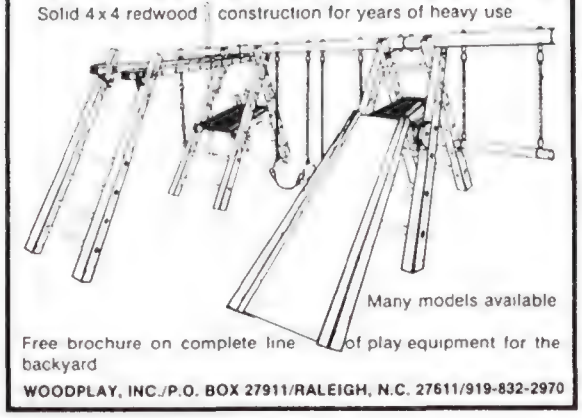

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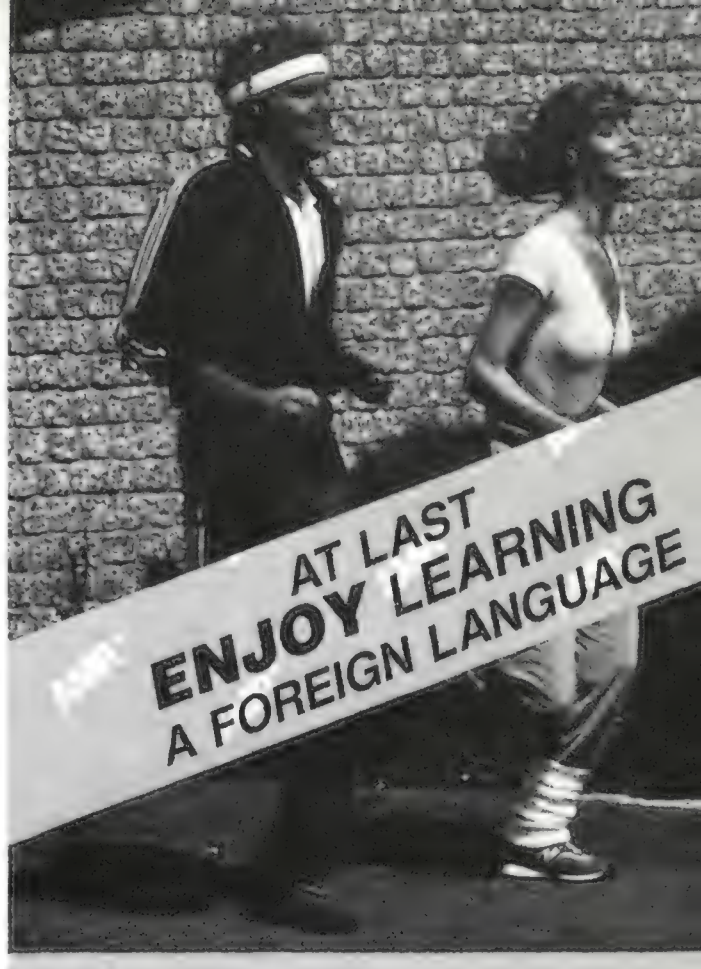

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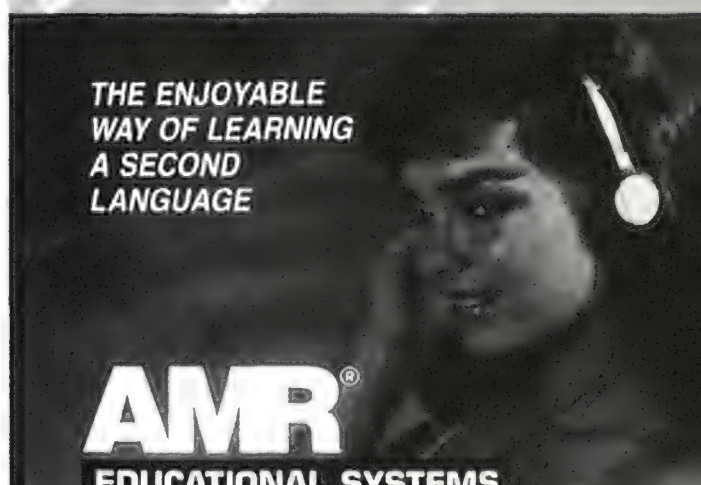

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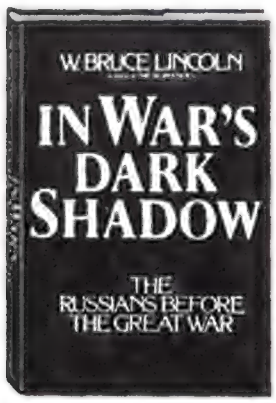

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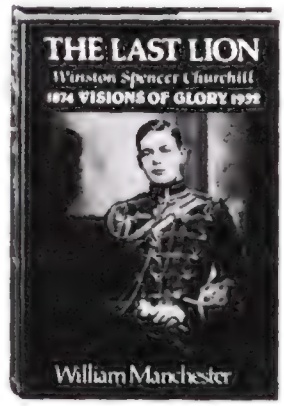

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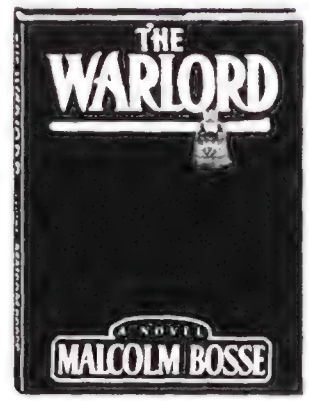

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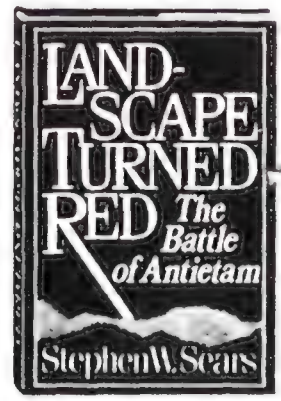

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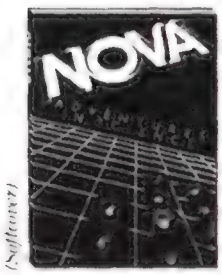

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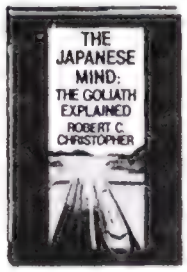

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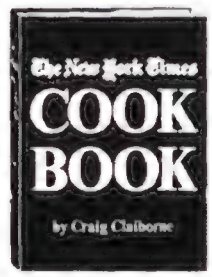

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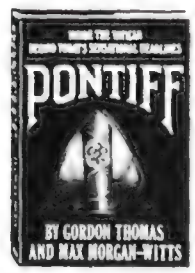

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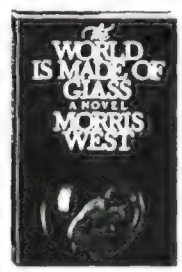

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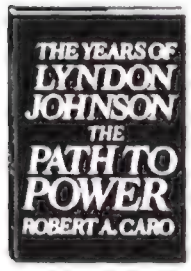

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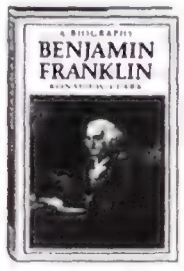

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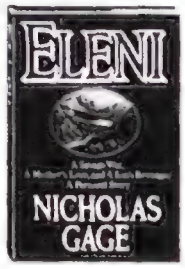

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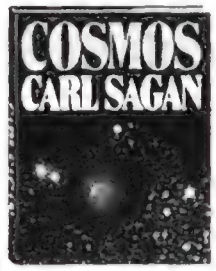

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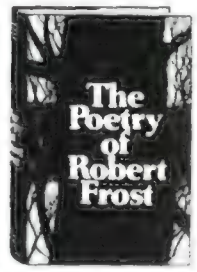

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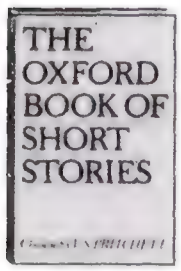

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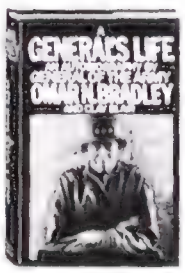

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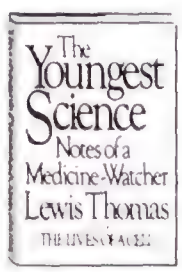

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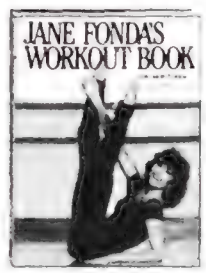

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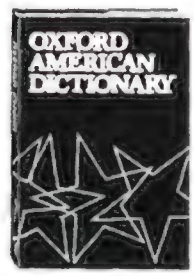

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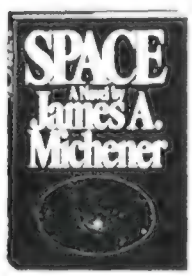

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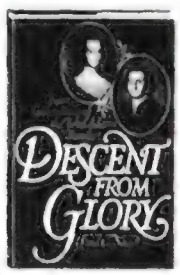

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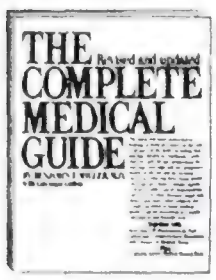

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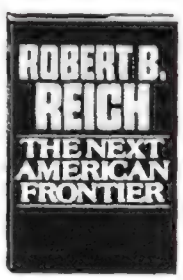

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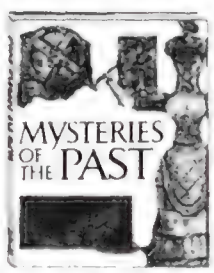

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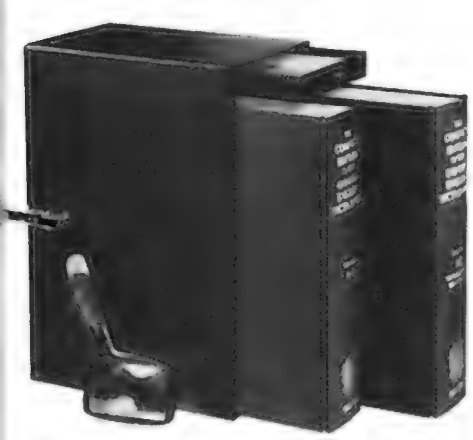

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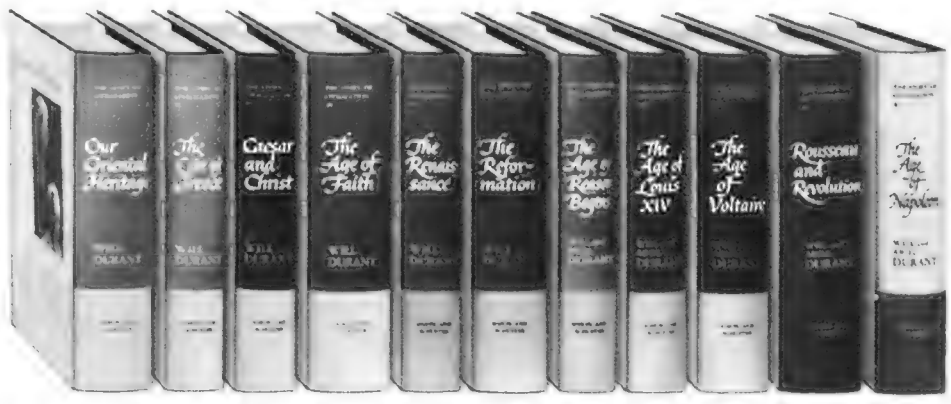

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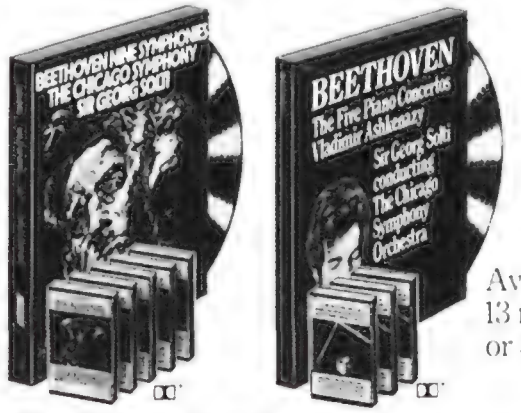
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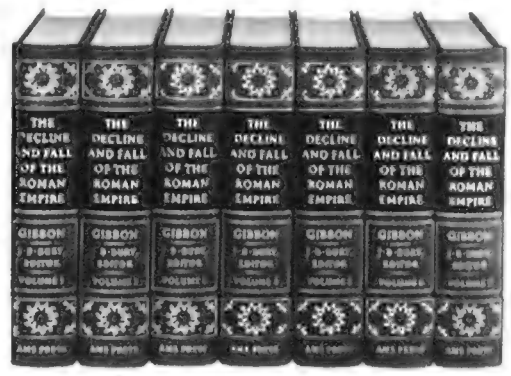

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Around the Mall and beyond

The new "Stars" gallery at the National Air and Space Museum gives us a detailed and entertaining view of the heavens and of the effect of its inhabitants upon us over the ages. I enjoy it greatly, but I especially like to watch the people who are watching the various displays.

There's one section that demonstrates how a far-ranging modern satellite is remotely controlled from Earth so that it does the bidding of astronomers, turning to aim its equipment at some distant object and transmit its findings. What it "sees" is then reproduced on a video screen in colored designs that indicate the chemical composition of the target.

I found that older visitors tended to watch the simulation of the satellite turning in space in answer to commands from Earth and listen to the accompanying narration. But the youngsters kept their eyes glued on the video screen. They watched the design flash on it, then the little symbol (the "cursor") skip around the design to one particular spot where a scientist needed information. Immediately a graph would appear showing the chemical makeup of that specific target.

This wasn't too easy for the older folks. Computer concepts are still a bit strange to them. But the kids are right at home with the computerized display. After all, they've all spent hours busting up enemy spaceships in family fun centers. All those symbols, all that color enhancement, all the intricate designs with every feature carried out by tiny squares, are old hat to the young heads. And it all takes place on something as deliciously familiar to children as their own beds—a good old television screen.

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"Stars" shows us what's up there. And another exhibit, this time at the Museum of Natural History, shows us what used to be up there and is now down here. On temporary display on the ground floor are two meteorites. One is slightly larger than a golf ball, the other is the size of the pink grapefruit we buy at the market. A thin-skinned one with lots of juice weighs about a pound and a quarter. The meteorite weighs just under six pounds.

To look at the objects you wouldn't think they were worth very much. The Hope Diamond they ain't. They're gray and lumpy and blackened by heat. They look like rocks that have been through the fires of hell, and considering the pollution of our atmosphere this summer, that's a pretty accurate description. Of course our atmosphere is even harder on meteorites than it is on us. Only about 500 of them a year are estimated to survive it out of all the thousands that come flaming through it from space—the shooting or falling stars that thrill us as they dart into oblivion. Hardly any of the 500 are ever recovered.

These two were recovered, all right. The little one smashed into a house in Wethersfield, Connecticut, in April 1971. The larger one smashed into a house in Wethersfield, Connecticut, in November 1982. The houses are less than two miles apart. And if you asked a Las Vegas expert what the chances are for two meteorites to reach Earth that close together both in space and time, he would say the chances are one in some figure with so many zeros it would take up most of the rest of this column.

The Smithsonian is ever alert to reports of recovered meteorites, and Dr. Roy S. Clarke (p. 24), a curator in the Department of Mineral Sciences at the Museum of Natural History, hurried right off to Wethersfield to look at the 1982 object. He brought back for analysis the meteorite and a few fragments that had broken off as it slammed through the house. He also brought back an indication that the homeowners would lend their uninvited visitor from space to the Smithsonian—which already had the first Wethersfield meteorite—for display and study. Finally, Dr. Clarke collected a great yarn about the astronomical coincidence.

Wethersfield is a pleasant suburb of Hartford, the Connecticut state capital. It lies a few miles south of the city and was settled in 1634. Among the inhabitants are Robert Donahue, an insurance-company employee, and his wife, Wanda, a retired schoolteacher.

At about 9:15 P.M. on November 8, 1982, the Donahues were in a sort of family room adjoining their kitchen, about 15 feet from the living room. They were watching *M*A*S*H* on television. A muffled but alarming explosion from the front of the house broke in on Alan Alda's wisecracks and sent the Donahues flying out of their chairs and into the living room. It was filled with dust and what looked like smoke, and a big, lopsided hole had been torn in the ceiling. The dining room also was a mess. Wanda Donahue had a fleeting thought that a bomb might have been thrown into the house.

They called the police and fire departments, and the response was quick. A fireman studied the ceiling hole with debris hanging from it, found another gash in the dining-room ceiling, a dent in the wall and an overturned chair, indicating that something had caromed around that room. And then he saw, under the dining-room table, this black-and-gray lump.

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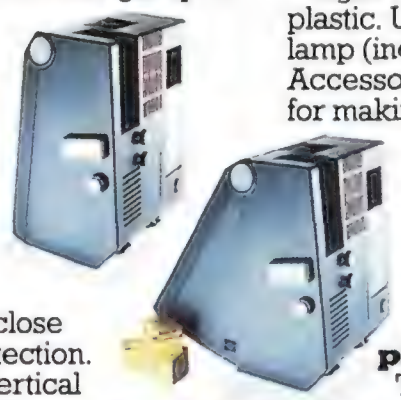

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Roy Clarke holds Wethersfield meteorites.

"Why, I think that's a meteorite," he said.

Probably only a Wethersfield fireman could have made that statement with such calm authority. For Wethersfield is the only town in the world where falling meteorites are old stuff. Many of the same police and fire officials remembered the happening of April 1971.

April 1971. Mr. and Mrs. Paul J. Cassarino were asleep. Mrs. Cassarino got up at six to get breakfast started, and when she walked through the sitting room she found such a mess of dust and shattered plaster that she was sure there had been an intruder.

Police and firemen arrived. They found a hole in the roof. The ceiling of the sitting room was directly under the roof hole, but it was mainly intact. Whatever had smashed through the roof had not penetrated the ceiling, but it had knocked loose some plaster. The officials investigated and found the little meteorite lodged right there in the ceiling. After a few days of negotiation, the Smithsonian acquired it.

Both Wethersfield objects were analyzed by the Institution and found to be of the common type, called L6 chondrite, a form of extraterrestrial rock. Both were crusted from the melting of their surfaces in the heat of entry. The thin crust and shape of the bigger meteorite indicated that it may have been part of a larger object that broke up. On the other hand, the lack of the radioisotope cobalt-60 in-

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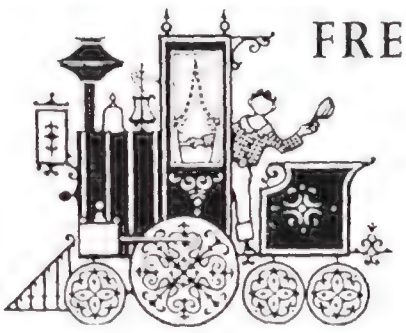

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dicated that the parent body couldn't have been very big.

Wethersfield owns the game when it comes to two meteorites hitting neighboring homes, but in the past they have struck the Earth in the same place. Dr. Ursula Marvin of the Smithsonian Astrophysical Observatory notes that Meteor Crater, a tourist site near Winslow, Arizona, was caused by an iron meteorite. But a stony meteorite was found near its rim. At an Ontario site, a relatively new crater, geologically speaking, is superimposed on a formation believed to be part of a very old crater. There was a lot more than 11 years between those impacts.

One aspect of a meteorite's making it into civilization is that its approach can be reported. Observers of the second Wethersfield object mostly agree that it appeared from the northwest as a blazing fireball and seemed to break into two or three pieces. The townsfolk seem rather blasé about the affinity their town has for these arrivals from space. I wouldn't be. I would be looking for a reason why this nice suburb has been singled out. Author Thornton Wilder wrote a whole book on the premise that there must be some reason for fate to strike at random. In *The Bridge of San Luis Rey* he asks why the five victims of a broken bridge in Peru should have been crossing it at the moment it snapped. Did something in their lives mark them for their fate?

Fortunately, no one was hurt at Wethersfield, but I was intrigued to read the account of one witness of the recent visitation. On that November evening he was out on the road indulging in the pastime I so often decry: he was, in fact, jogging. He reported that the sky lit up, and he raised his eyes from the hypnotic view of his Keds thumping on the macadam, and he saw a fireball coming straight at him. It didn't seem to move in the sky. It just got bigger, very fast.

At the last moment, to his unutterable relief, it whizzed on to Wethersfield a few miles away, and he heard distant sounds like gunshots from that direction.

Despite the snide remarks I have occasionally made about joggers, I wish them no harm. I haven't any influence, anyway, but I can't help wondering if someone up there got a bit fed up with jogging and figured that just a little scare, maybe . . .

The exhibit, at the Constitution Avenue entrance, ends in late October.

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Phenomena, comment and notes

The pygmy hog-sucking louse is in trouble. So are certain worms, snails, spiders, beetles, ants and sea urchins. And so, in a sense, is the conservation community, which has nailed its colors to the mast. By issuing a *Red Data Book* on endangered invertebrates, the International Union for Conservation of Nature and Natural Resources (IUCN) has served notice that it wants to save the ugly and obscure as well as the beautiful. This preliminary roll call of endangered invertebrates seems certain to provoke derision; if it is difficult to save the whales or the pink pigeons of Mauritius, imagine the response to campaigns to save sea slugs and damselflies.

Established *Red Data* books cover birds, mammals, reptiles and amphibians, and plants. This latest venture is similar to the plant compilation in that it makes no pretense of being complete. It never will be. The compilers estimate that there are 46,000 species of vertebrates (more than half of them fish) and a quarter of a million flowering plants. Known invertebrates total about 1.4 million, but anywhere from two to ten million more species may remain to be described.

Even for those organisms known to science and known to be endangered, it is much more difficult to be precise than it is with birds and mammals. Species are included in the book because their population or their range is clearly declining (the giant carrion beetle of North America, which buries the carcasses of small animals, was once found in 30 states but is now confirmed only in a part of Rhode Island). But such information is simply not known for most species, especially in South America, Africa and Asia.

Categories in the book reflect this lack of knowledge. In addition to endangered (in danger of extinction), vulnerable (likely to move into the endangered category in the near future) and rare (small world populations that are at risk), some species are listed as indeterminate, which means they are believed to be endangered, vulnerable or rare, but not enough is known about them to say which. Still another category is "insufficiently known," meaning species that are suspected but not known to belong in one of the threatened categories. Several giant clams (p. 30) are listed in these last two classifier's limbos.

Then the book introduces three entirely new categories, not used in the other *Red Data* books. "Commercially threatened" is for species most or all of whose populations are threatened as a sustainable commercial resource, as is the queen conch in some parts of the Carib-

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A giant triton, whose shell is prized by collectors, moves in on a starfish.

bean (SMITHSONIAN, March 1982). A "threatened community" is just that; one is Taka Bone Rate coral reef in Indonesia, where a large number of invertebrates are threatened along with the reef itself. And then there is "threatened phenomenon," in which aggregations of organisms, not themselves threatened, are somehow endangered. One such is the overwintering of monarch butterflies in California and Mexico, where millions can congregate in very small areas, coating the trees in orange and black.

I really believe in all the reasons advanced for the conservation of any and all living species. The World Conservation Strategy adopted by the IUCN summarizes them as well as anyone:

- "To maintain essential ecological processes and life support systems (such as soil regeneration and protection, the recycling of nutrients and the cleansing of waters) on which human survival and development depend;
- "To preserve genetic diversity (the range of genetic material found in the world's organisms) on which depend the breeding programmes necessary for the protection and improvement of cultivated plants and domesticated animals, as well as much scientific advance, technical innovation, and the security of the many industries that use living resources";
- And "to ensure the sustainable utilization of species and ecosystems (notably fish and other wildlife, forests and grazing lands) that support millions of rural communities as well as major industries."

I would add esthetics. The Queen Alexandra's birdwing butterfly of Papua New Guinea (SMITHSONIAN, May 1979) is a color burst of pale iridescent blue and green, or cream and chocolate brown, with a bright yellow abdomen and bright red coloring near the bases of the wings. More to the point, the wingspan of the female can exceed ten inches, making it one of the largest butterflies in the world. It has been protected since 1966, but its only habitat in and around the Popondetta Plain is being threatened by the oil-palm and logging industries. The giant triton (left) has a gorgeous shell—and may be the victim of overcollection.

Less esthetically pleasing, perhaps, but equally superlative are the giant earthworms of Washington and Oregon. They can grow to be well over 20 inches long, which inspires fantasies of very large hooks and still larger fish. The Washington species is found in hawthorn shrubland which has nearly disappeared from the Pelouse country of southeast Washington. Its Oregon counterpart lives in moist forests. Both habitats are being lost to croplands, logging or development, but the Washington and Oregon offices of the Nature Conservancy are interested in protecting at least one site for each species.

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Giant clams are exploited, particularly by Taiwanese, for both shell and meat.

The pygmy hog-sucking louse is neither beautiful, as far as I know, nor superlative. Not much is known about it (the male, in fact, is "unknown," which I find distressing). It is a vector of rickettsial and other diseases, but presumably is a threat only to hogs that were feeble in the first place. But bacteria that live on the louse produce B vitamins, and they could someday have value for genetic engineers.

The louse is endangered because the pygmy hog is losing its habitat, the scrub savannah of northwest Assam in India. If we should want to save the bacteria, we have to save the louse. To save the louse we have to save the hog. And to save the hog we have to save some savannah.

People will laugh at campaigns to save worms and beetles. But I hope the campaigns succeed, every one of them, because any effort to save any organism almost always means saving a bit of habitat. And that piece of habitat will be home not only to the worm or beetle in question, but to any number of other invertebrates, reptiles, mammals, birds and plants. To me a weed-grown vacant lot on a city street is a patch of wild beauty, a breath of fresh air. And as agriculture and urbanization eat away at whatever wild lands remain, we will need all the "vacant lots" we can manage, outposts of the biological system that sustains us all.

So if the Nature Conservancy steps in to preserve the last stands of North America's giant earthworms, I rejoice that a patch of hawthorn shrubland—and everything in it—is being saved as well. If the piece of Rhode Island where the giant carrion beetles still bury the dead is set aside, I am as happy for the habitat as I am for the beetles.

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The Optimum Shape

The Optimum Shape

Researchers at the General Motors Research Laboratories have developed the first integrated system for computer design of mechanical parts with minimum mass. Optimal Shape Generation automatically optimizes the component shape in a single computer run.

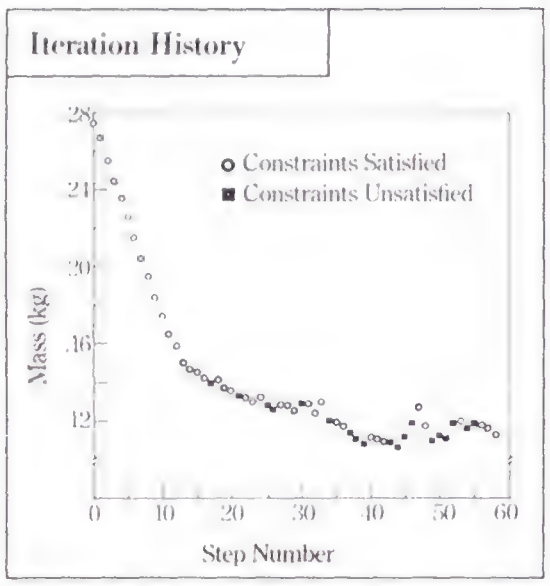
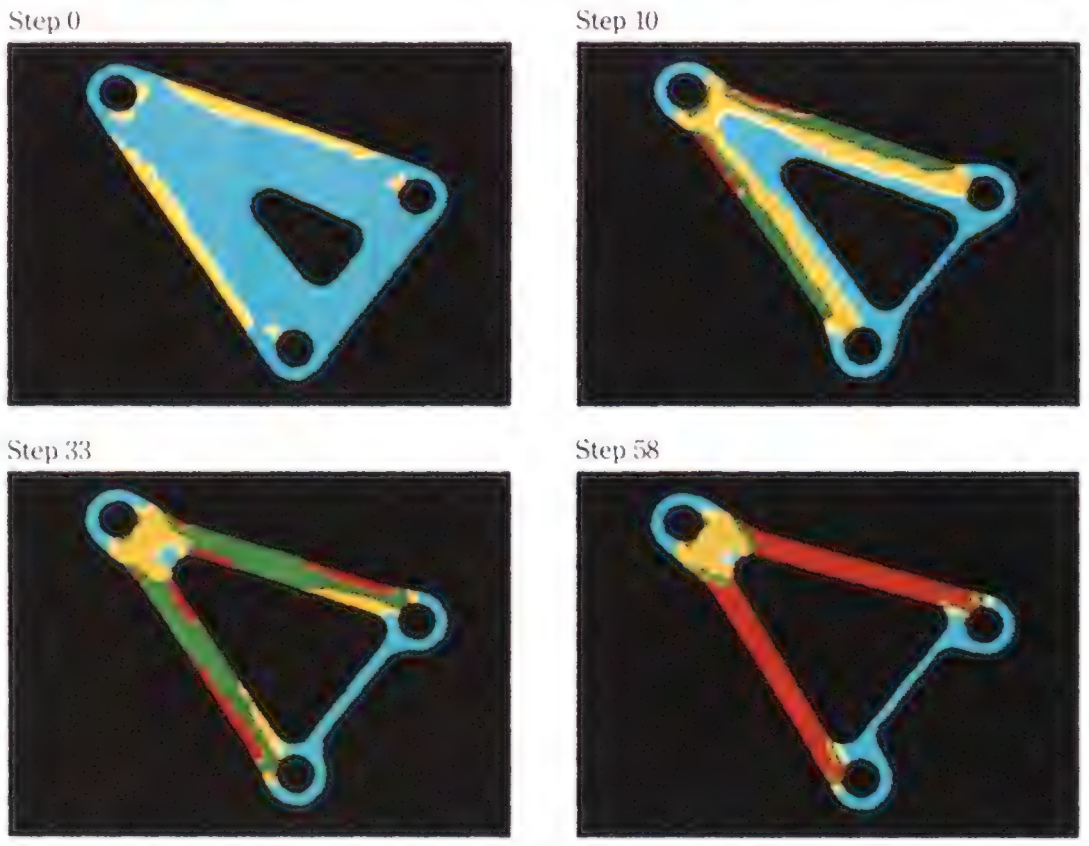


Figure 1: Decreasing mass plotted as a function of design iterations for the component shown in Figure 2.

Figure 2: Shapes as they appear on the CRT screen in the design of a minimum mass automotive component capable of performing under the structural loads. Color changes indicate (blue→yellow→green→red) increasing stress levels within the design limits.



COMPUTER-AIDED design systems automate the processes of generating geometric data and engineering drawings of parts, but they do not determine whether these parts meet structural performance requirements. In an ongoing research project at the General Motors Research Laboratories, a system has been developed that automatically ensures that the design meets structural performance constraints. More important, Optimal Shape Generation provides the component shape with the minimum mass capable of satisfying structural demands in a single computer run, without requiring human interaction with the machine.

In the last two decades, extensive research has been done in the area of computer design of structural components. Most of this work has focused on individual aspects of the process. Drs. Jim Bennett and Mark Botkin have succeeded in integrating the process from description of the model through convergence to the optimum solution.

Conventional systems continue distinctions characteristic of age-old "build and test" methods by separating the tasks of design generation and design analysis. Typically, a "designer" uses one computer system to produce engineering drawings of a given part. The task then shifts to an "evaluator" who creates a mathematical model with which to test the design on another computer system. The evaluator determines only whether or not the design meets the requirements. A lengthy interaction between the designer and the evaluator is required to optimize the design. Optimal Shape Generation integrates the process from design generation through design optimization. The system can generate the mathematical model from the design data as the shape changes without requiring additional input, thereby turning the process from a multiperson, multimachine operation into a one-person, one-machine operation.

Since there is no interaction beyond the initial input, a flexible description of the problem is crucial to effective use of the system. The researchers responded to this challenge by developing a geometric format based on a parametric description of the boundary. Defining the problem with geometric data is desirable because it describes the shape of the part in a

form directly suitable for conceptual visualization.

Because the boundary geometric description must be transformed into an analysis model not once but several times, some type of automatic finite element mesh generation is required. The researchers adapted a mesh generation technique which divides a closed region into triangular elements based on a discrete description of the boundary. The sizes of the elements of the mesh are determined by a characteristic length selected for each problem and are related to the need for accurately describing the geometry. Automatic triangulation is used to create a set of connectivities for the discrete points placed uniformly throughout the part's interior with approximately the same density as the boundary points. The combination of boundary data description and automatic mesh generation permits the system to accommodate major changes in shape from the initial design.

ADEQUACY of the triangular meshes to calculate accurate stress levels was next addressed by the development of an adaptive mesh refinement scheme. By evaluating the solution for the uniform mesh created by the choice of characteristic length and identifying areas where the strain energy density changes rapidly, the system selects the areas of the mesh that require mesh refinement. These refinements can take the form of either adding elements in the area to be refined or increasing the order of the finite element polynomial interpolation. The former approach has been taken, because it can be implemented automatically and does not require the formulation of new finite elements.

The culmination of the process introduces an optimization routine which directs the design toward a minimum mass configuration. A mathematical optimization technique is used to change the design to that shape giving minimum mass within the structural constraints. This optimization technique is based upon a sequential first-order Taylor series approximation of the constraints and a feasible directions solution of the problem. Periodic mesh refinements are performed throughout the optimization, since the design is continually changing, and the system must predict the stresses and the behavior of the constraints as the design changes.

"By taking an integrated approach," says Dr. Bennett, "we're able to combine the objectives of reducing the mass of the material and meeting structural performance requirements in a single automatic system."

"We expect," adds Dr. Botkin, "that in the future this technique will become the standard way of designing structural components."

General Motors

MARK OF EXCELLENCE

THE MEN BEHIND THE WORK

Drs. Jim Bennett and Mark Botkin are members of the Engineering Mechanics Department at the General Motors Research Laboratories.

Dr. Bennett holds the title of Assistant Department Head. He attended the University of Michigan as an undergraduate and received his graduate degrees from the same institution in the field of aerospace engineering. His Ph.D. thesis concerned non-linear vibrations. Before coming to General Motors in 1973, he taught aeronautical and astronautical engineering at the University of Illinois.

Dr. Botkin is a Staff Research Engineer. He received his undergraduate and graduate degrees from the University of Missouri at Rolla. His graduate work was in the field of civil engineering, and his doctoral thesis concerned structural optimization. Prior to joining General Motors in 1978, he worked for four years as a consultant to computer applications engineers.

By John Keegan

'We wanted beady-eyed guys just absolutely holding the course'

Forty years ago, the U.S. 8th Army Air Force and the city of Schweinfurt endured a bloody raid that was aimed at ending the war early

Today, airpower has a bad name. One way or another, instantaneous death from the skies now threatens about half the human race, with the rest doomed to linger only a little way behind. Indeed, so potent has the air become as the medium for an exchange of death-dealing weapons that most traditional land and sea forces have dwindled into secondary significance. Nations that used to shrink from the sound of gunfire or the threat of sea blockade now find armies and navies almost reassuringly old-fashioned. It is the third service, and the skies in which it operates, that have the power to terrify.

Time was when airpower was seen quite differently, as an almost surgically beneficent means of bringing an enemy to his knees, with little pain either to him or to his opponent. The vision even had a slogan, "Victory through Airpower," and, appropriately, was most fully espoused in America. I say "appropriately," because the view combined moral scruple, historical optimism and technological pioneering, all three distinctly American characteristics.

Just 40 years ago this month, the first experiment was made to see if victory could indeed be won through airpower. The instrument was the Eighth Army Air Force. The target was an "industrial bottleneck," a complex of ball-bearing factories in Schweinfurt, Germany, deemed crucial to Hitler's war effort.

Attacking industrial bottlenecks in hope of destroying an enemy's economy was not a new idea. The British had tried it early in the war. But in 1941 daylight raids on German military positions in occupied countries, the Royal Air Force Bomber Command suffered such high casualties that they were forced into attacking under cover of darkness. Night bombing proved shamefully inaccurate, however. During 1942 many RAF bombs were falling in open countryside 25 or even 50 miles from the intended target.

These events provoked a court revolution in the RAF and brought to power Air Chief Marshal Sir Arthur Harris. His policy was brutally simple. Since the RAF could not hit what it chose, it would hit what it could, *i.e.*, German cities. As he saw it, the effect would be to weaken Germany's will to fight, a classic object of strategy and perhaps a more direct way to victory than attempted destruction of industrial bottlenecks. So began those much publicized "Thousand Bomber" raids, with devastating firestorms of the kind that would destroy Dresden in 1945.

The U.S. Army Air Force was by no means ready to follow the same road. It had built its identity on the

On August 17, 1943, B-17 bombers wheel high above a cluster of burning factories deep inside Germany.

In artist's re-creation, a burning Fortress begins to slide out of the comparative safety of a "combat box."

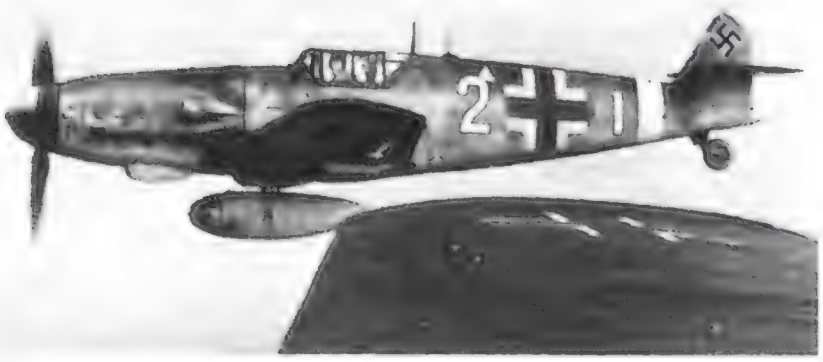
Allied fighter cover has long since been left behind, and German planes are attacking in line from head-on.

principle of precision bombing. In the 1920s, General William Mitchell had outraged the U.S. Navy by demonstrating that airplanes could hit and sink battleships. By the late 1930s, the Army had acquired the Boeing B-17 bomber and the Norden bombsight. Together they promised the kind of accuracy that, as airmen liked to boast, could put a bomb into a "pickle barrel" from 25,000 feet. If, like RAF bombers, the Boeings were to journey to Germany only by night, they would not be able to see their targets under attack clearly enough to produce accurate results, and thus justify their existence and their tactical mission.

For the young enthusiasts of the USAAF, moreover, "Victory through Airpower" was more than a slogan. It was a formula for a revolution in strategy. From the moment the Eighth Air Force arrived in Britain in February 1942, pilots threw themselves with passionate energy into the business of making daylight bombing work. At first they lacked the experience and equipment to venture farther than just across the Channel to Occupied France, but they knew their real goal would be targets in Germany.

In January 1943, the British air marshals argued that the American effort should be incorporated into their own, which would put an end to daylight bombing. But Maj. Gen. Ira Eaker, Commander of the Eighth Air Force, fought them off. In a tense meeting he presented Winston Churchill with an eight-point memorandum arguing the case for both day and night bombing. Churchill was impressed by Eaker's Point Three: "By bombing the devils around the clock, we can prevent the German defenses from getting any

Messerschmitt Bf 109 had two 13mm machine guns.



Messerschmitt 410 had up to six 20mm cannons.

During raid the Luftwaffe had more than 300 Messerschmitt and Focke Wulf fighters in action.

rest." Eaker then declared that the Eighth was now ready, and would be bombing targets inside Germany within a month. Churchill was persuaded.

The eventual outcome was Operation Pointblank, aimed at liberating Europe by a Combined Bomber Offensive, with two air forces complementing each other in sustained day and night attacks.

Eaker set his command four main sets of targets: submarine bases, the aircraft industry, oil refineries and, finally, ball-bearing plants. By the reckoning of his economic advisers, the Eighth Air Force would thereby bring under attack the whole range of production upon which the German war effort depended.

German flak and fighters together had driven the RAF into night bombing, and rather more the fighters than the flak. British aircraft, carrying only three gunners and light .303 guns, made vulnerable targets. But it was not for nothing that the B-17 was known as the Flying Fortress. Its 11 machine guns were .50 caliber, and often more guns were added. Moreover, the perfection of close-formation tactics now allowed Flying Fortresses to proceed toward their targets in a mutually supportive "self-defending box." A typical formation consisted of three 21-plane groups, staggered at slightly different altitudes. This gave American bombing raids a menacing firepower from which all but the most determined German fighters might flinch.

During 1943, most German fighters were busy supporting German armies in North Africa and in Russia. Those available for the defense of the Reich, under the command of the great ace Adolf Galland, numbered only 500. Four hundred were single-engine day fighters. Naturally, no fighter was the equal of a B-17 in firepower. The Messerschmitt Bf 109 mounted a 20mm cannon and two 13mm machine guns; the Focke Wulf 190, four 20mm cannons and two 13mm machine guns. Most dangerous were twin-engine Messerschmitt 410s which, though vulnerable to fighters, carried up to six cannons and four machine guns.

Additional armament could, and later would, be added. But, in the opening stages of the Luftwaffe's battle with the Eighth Air Force, the odds pitted individual German pilots against a "combat box," the fire of whose 200 or more machine guns interlocked to make an attacking approach seem suicidal. It was an added disadvantage to the Germans that in cloudless weather the Norden bombsight permitted accurate bombing from above 20,000 feet, at which altitude the fighters' engines were straining at the limit of their efficiency.

Deeper and deeper into Germany

As the numbers of American aircraft in England rose toward the 800 thought necessary for a sustained offensive, and the skills of the crews increased, General Eaker chose targets deeper and deeper within Germany. In January, for the first strike, it had been Wilhelmshaven, the northern naval base, against which 91 bombers flew. By July, 300 aircraft were flying 375 miles into central Germany to attack aircraft factories. As they ventured farther afield, more flight time was spent without protection from their own escorting fighters, which, because of their limited range, were forced to turn back at the German border.

The Luftwaffe, meanwhile, was learning the tricks of engaging Fortress formations. Somewhat weaker armament in the nose of the B-17 prompted some German pilots to approach from ahead and to combine their firepower in group, or "pack," attacks. Attacking from the rear was also frequent. If a tail gun was

Focke Wulf 190s had machine guns, four cannons.

put out of action, fighters could attack again with much more safety. By midsummer, new weapons were issued to help in blowing close formations apart. One was an aerial bomb, dropped from above to explode in the middle of a combat box. Another was the 30mm cannon, fixed beneath the wings of many Focke Wulf 190s. Galland's fighter pilots often managed to cut out Fortresses from the aerial herd, one by one, and pick the lone aircraft to pieces. It might take 20 or 25 cannon strikes to finish one of the big American planes, but there was time in plenty for that during the three hours a lone Fortress took to straggle home to England.

By August, the Combined Bomber Offensive was approaching crisis. On the British side, RAF Bomber Command was just holding its own against improving skills of the German night-fighter force. Its "area bombing" was not significantly reducing industrial output, and whatever damage it did to civilian morale was too local and temporary to be worth the effort expended. Eighth Air Force's daylight campaign was having an even more dubious result.

Appearances were magnificent, of course. No one—certainly none of the English villagers who watched them depart day after day—could fail to thrill at the sight of the great phalanxes streaming away from their East Anglian airfields. Squadron after squadron, they rose to circle into groups and wings and then set off southeastward for the sea passage to their targets, a shimmering and winking constellation of aerial grace and military power, trailing a cirrus of pure white condensation from 600 wing tips against the deep blue of English summer skies. Three thousand of America's best and brightest airmen were cast aloft by each mission, ten to a "ship," every ship with a characteristic nickname, often based on a song title, like *My Prayer*, or a line from a film, like "I am Tondelayo." Each Fortress weighed 30 tons and hauled 5,000 pounds

Historic photograph, taken by automatic camera in a bomb bay, shows just-released 500-pound bombs.

Beyond, to the right, another group of B-17s passes smoking target, ball-bearing plants on river Main.

of bombs while cruising at 165 miles per hour. It was manned by two pilots, bombardier, navigator, top-turret gunner, radioman, as well as two waist gunners, a tail gunner and a ball-turret gunner.

So much for appearances; realities, though heroic, were bloody, chaotic and cold. (At 20,000 feet it drops below −25 degrees F. Three out of four wounded airmen came back with frostbite.) German radar reached out to touch the Fortress formations even before they breached the flak defenses lining the Dutch coast. And when they had flown past the coastal guns, radar helped lay the trap of fighter concentrations which would set upon the Fortresses as soon as their own escorts turned away. Swarms of Focke Wulfs and Messerschmitts drove into the combat formations. The surviving B-17s often reached England with feathered propellers, gaping holes in their airframes, and riddled tail assemblies, burning flares that signaled dead or desperately wounded crewmen aboard.

And after each mission, too few came home. In the summer of 1943, crew losses ran as high as ten percent a mission. Statistically, at least, that ruled out any hope of a Fortress crew surviving the 25 missions required by the Air Force before rotation home was possible. In "Blitz week," the last week of July 1943, when the daily total of B-17s available was less than 400, a fourth were lost or scrapped, and the equivalent of 90 crews killed, disabled or missing.

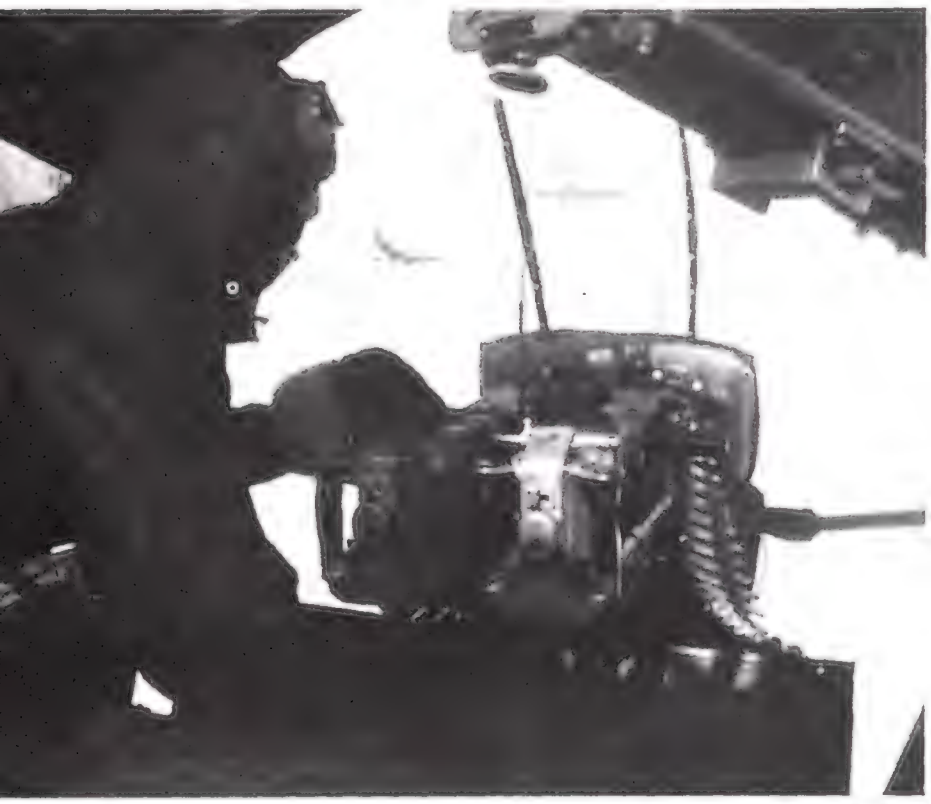
Ball bearings and bombing theory

The Schweinfurt raid, therefore, was to be a make-or-break operation. Forty percent of all ball bearings used by the German war economy were produced in that little Bavarian city. Production was concentrated in a complex of factories occupying only about one square mile. The place seemed to offer a perfect test of strategic-bombing theory, for the site was compact enough to make an ideal daylight precision target, yet large enough so that if production could be brought to a halt, it theoretically would interrupt the building of the very fighters which were the main threat to the Combined Bomber Offensive.

The total operation was actually a dual thrust. The 4th Bombardment Wing was to overfly Germany, attack the Messerschmitt works at Regensburg and fly on, to land in North Africa at the bases used in a recent attack on the Romanian oilfields at Ploesti. Ominously, 54 of 175 aircraft had failed to return from the Ploesti mission. Meanwhile, the 1st Bombardment Wing was to make the Schweinfurt attack alone.

Designated strike crews were not told their destination. Starting in July, they were kept from flying any combat missions until the special raid was over. Accuracy became a compulsion for the crews. Navigator

Key to daylight raids was Norden bombsight, reputed to put bombs in a pickle barrel from four miles up.



Special nose guns were often installed in the B-17s to correct problem of inadequate forward firepower.

The ball turret under the ship's belly was cramped and exposed, but statistically safest place to be.

Harry Crosby of *Just a Snappin'*, one of the lead planes for the proposed Regensburg raid, remembers being delighted that his pilot was famous for careful flying: "We didn't want any Hairbreadth Harry types," Crosby noted. "We wanted beady-eyed guys just absolutely holding the course, sweating and working hard to keep the subtle settings right in."

The final briefing came at dawn, August 17th. Bombardier Ted Winslow jr. of the 91st Group, which led the Schweinfurt raid, recalled that the briefing opened: "Our target today, gentlemen, is the ball-bearing factory at Schweinfurt. If we are successful in putting this plant out of operation we shall, no doubt, shorten the war by a considerable length of time."

For the great day the 1st Bombardment Wing had managed to assemble 230 airworthy B-17s. Just before noon they set off from nine English bases, slowly assembled into two large task forces, and headed over the North Sea at 1313. Above the Netherlands they were picked up by RAF Spitfires, which in turn handed them over to longer-range P-47 Thunderbolts.

Saying goodbye to "little friends"

When the Thunderbolts turned away, the ride got rougher. On voice radio, escort fighters were referred to as "little friends," German interceptors as "bandits." Capt. William Smith of the 351st Bomb Group felt lonely as he watched the little friends depart; he could already see the tiny specks in the sky that meant bandits approaching. In the 29 minutes between the crossing of the German border at Eupen and the first sharp navigational turn toward Schweinfurt, the Wing was brought under continuous fighter attack. The 4th Bombardment Wing, which had just gone the same route on its way to Regensburg, had a terrible passage. Those who followed the lead planes had to fly through "the strewn wake of a desperate air battle, where disintegrating aircraft were commonplace and sixty 'chutes in the air at one time were hardly worth a second look."

Now the 1st Wing had the same experience. In the aerial column that stretched out for more than 20 miles over the German countryside as it fought its way toward Schweinfurt, the lead plane was *Oklahoma Okie*, flown by Lt. Col. Clemens Wurzbach and navigated by Lt. David Williams, the man responsible for guiding the whole force to the target. Just behind came *Lady Luck*, bearing Brig. Gen. Robert Williams, the commanding general of the 1st Bombardment Wing. The fierceness of the attack was daunting. Lieu-

Six Armies in Normandy, *military historian John Keegan's celebrated World War II study, has just recently been released in paperback.*

Busy navigator of *Tondelayo*, Lt. Elmer Bendiner, heard accounts of falling comrades over the intercom.

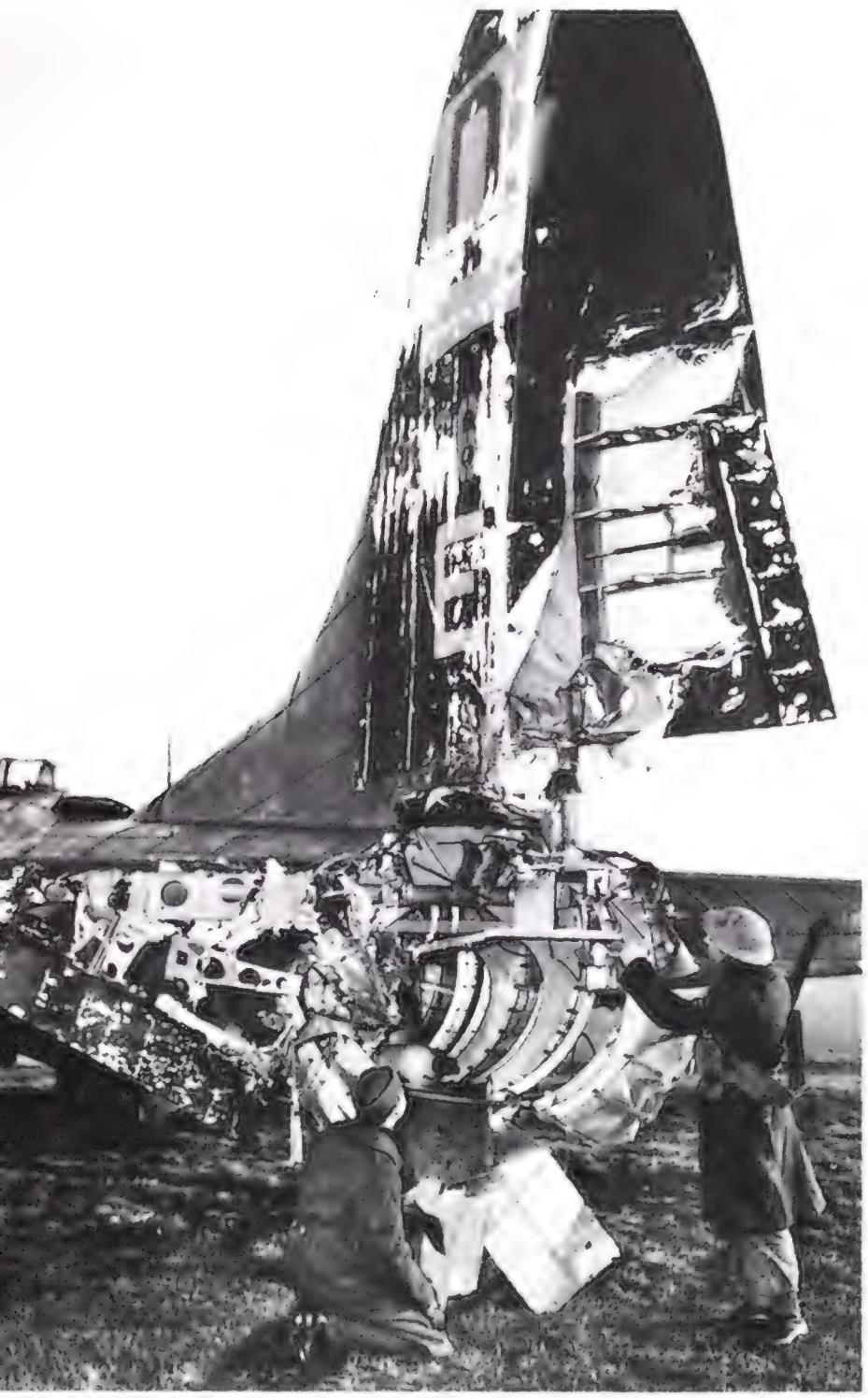
Navigator of lead Fortress over Schweinfurt was Lt. David Williams, 22, of Valparaiso, Indiana.

tenant Williams spent so much time at the twin .50 caliber machine guns, fending off German fighters, that—as he apologized—his navigator's log was "sparse" and "unkempt." At times, he said, he was almost up to his knees in empty .50 caliber cartridges. The assault from dozens of fighters, often coming in 12 abreast, wing tip to wing tip, all guns blazing, shook up the close formations. General Williams, time after time, had to go on the radio with the reminder: "Tighten formation! Tighten formation!"

Elmer Bendiner, navigator aboard *Tondelayo*, a B-17 of 379th Group, listened to a "running chronicle from the tail and waist describing the fall of planes . . . 'Plane in flames, 'chutes opening'; 'Plane falling like a stone—no 'chutes.' I remember looking down somewhere after Eupen and counting the fitful yellow-orange flares I saw on the ground. At first I did not understand them. Here were no cities burning. No haystack could make a fire visible in broad daylight 23,000 feet up. Then it came to me as it came to others—for I remember my headset crackling with the news—that these were B-17s blazing on the ground."

German ingenuity in pressing the attack was remarkable. "Frequently they closed to spitting distance," Lt. Anthony Arcaro, pilot of *Eagle's Wrath*, recalled. One attacking Me-109 rolled over so close that Arcaro could see the German pilot as if in "a movie close-up." Lt. Hans Langer, a German pilot based near Munich, which lay well beyond the bombers' route, climbed his Focke Wulf 190 right up into a Fortress box and found himself with a B-17 on either hand, with one behind and one barely 50 feet ahead as well. For a split second the startled American gunners held fire, for fear of hitting their own planes. Langer fired a cannon at the Fortress ahead, and saw its wing collapse as one engine tore loose. Then the big bomber flipped over, colliding with another B-17. There was a tremendous explosion, and a giant fireball. Langer blacked out. Somehow his plane fell clear of the bomber group. When he came to, he looked down and saw two Fortresses plunging to earth.

Most of crew of *My Prayer* bailed out when ship was afire. But wounded gunner Earl Cherry (third from left, standing), pilot James Judy (front row, left) and copilot Roger Layn (to Judy's left) stayed aboard and finally brought their ruined plane home.



Rugged B-17s often limped back to England despite gaping holes in fuselage and shredded tail assemblies.

In all, 21 Fortresses fell before the Wing reached Schweinfurt. Many others had suffered damage and wounds or death among their crews. It would have been bitter frustration to find the target obscured and to have had to bomb haphazardly through clouds. But the weather held. The lead planes put their loads neatly within the perimeter of the factory area, raising a pall of smoke as a marker to the groups following. Bombing procedure required that each plane fly straight and level for the final minutes between the Initial Point—where the bombardier takes over control of the aircraft—and the Aiming Point over the target, and then turn away toward the Rallying Point and so on home. In the second task force, which reached the target area last, Capt. Joseph Brown released his bombs into a pillar of smoke and fire. Then he shouted: "Okay! We're fighting for *us* now. Let's get out of here!"

The last B-17 cleared the Aiming Point at 1516. Behind it Schweinfurt's ball-bearing factories were burning from 80 direct hits. It looked, pilots said, like a gigantic bed of coals.

Three more Fortresses were shot out of the skies by German fighters on the homeward run to Eupen, seven over the Netherlands. Others were so badly hit that the final stage of the journey proved too much for them. *My Prayer* caught fire over Germany and went into a dive. The pilot, Lt. James D. Judy, ordered his crew to parachute to safety. As he fought to right the ship, most of them did so. But the top-turret gunner had been hit in the leg by flak, and his parachute was too burned to use. Judy decided he would try to bring her and the gunner home, no matter what. Copilot Roger Layn had chosen to stay aboard to help. Now, with the gunner, he managed to put out the flames. Then, despite his wound, the gunner took over the nose gun, Layn manned the waist guns, and together they tried to hold off German fighters, which followed the ship nearly to ground level where Judy set a zigzag course for home.

"People scattered when they saw us"

Said Judy later: "We came home at 210 mph, buzzing cities, factories and airfields in Germany. It was the first legal buzzing I've ever done. The people in Germany scattered when they saw us coming, but in Belgium they waved and saluted us." As the plane sank lower the crew frantically tossed things overboard to lighten ship. Surplus weight had been jettisoned before they crossed the Belgian coast. Lieutenant Layn remembers looking down, seeing a cheering ragged Belgian only a hundred feet below. A crewman had left a fine pair of G.I. shoes aboard. He grabbed them and carefully dropped them—as a gift of the Eighth Air

Force. *My Prayer* just barely made an English landfall.

Of 230 Fortresses that had left England, 36 aborted early. Of the 194 that attempted the mission, 36 were lost: 33 to fighters, one to flak, two to the sea. Others were damaged beyond repair. Reckoning up, almost 20 percent of the aircraft were lost—more than four times the acceptable loss rate. Galland, the German fighter chief, called August 17 "a disaster for the enemy."

"Hap" Arnold, U.S. Air Force chief, did not agree—even without knowing that Hitler's armament minister, Albert Speer, had reported a 38 percent drop in ball-bearing production as a result of the attack. When Arnold looked at the after-action reports, which estimated (rather generously as it turned out) that 228 German fighters had been downed in both raids, he declared: "The American idea—high altitude precision bombing—has come through a period of doubt and experimentation to triumphant vindication."

Alas, for all the courage and self-sacrifice of the high-level crews, Arnold was wrong. There was, as armaments minister Speer had feared, another raid on Schweinfurt, in October. It did about as much damage as the first, at the cost of 25 percent of American aircraft. But, for the most part, huge daylight-bombing raids deep into Germany were cut back until long-range P-51 Mustang fighters could be brought into operation. In the meantime, Speer began the dispersion of production that was to frustrate the Combined Bomber Offensive until after the invasion of Europe. Despite temporary cuts a shortage of ball bearings was never to threaten German war production. Indeed, even after months of investigation by the Strategic Bombing Survey after the war, the effects of the strategic bomber offensive were never clearly determined.

The only certain verdict on the Second World War was that its winning was bloody and destructive. It remains to the credit of Arnold, Eaker and their young crews of heroes that they set out with the genuine intention of sparing friend and foe alike the traditional costs of victory—and defeat.

Hardest-hit target, Schweinfurt ball-bearing plant was still a shambles when photographed by Margaret Bourke-White in May of 1945. But some other plants started limited production five weeks after the raid.

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On land and sea, when E.F. Hutton talks, people listen.

By Noel Vietmeyer

Some rare breeds face extinction down on the farm

Many older varieties of livestock, made 'obsolete' by new superbreeds, are now valued as genetic resources for the future

Joe Henson's farm is a living museum. Some of Britain's rarest farm animals—about 40 breeds in all—roam his softly folded emerald hills near Guiting Power, 100 miles west of London. Among Joe's sheep are Manx Loghtans, a breed with four horns—fewer than 50 of them remained in England when he started. There are also Soay sheep, a breed apparently unchanged since the Ice Ages. And St. Kilda sheep with huge conical horns, a breed the Vikings brought to Britain.

Joe's cattle include placid brown West Highlands (pp. 48-49) that have such long shaggy fur that you almost expect them to bark. And behind his stone fences are small black pigs with long snouts and white streaks down their hairy backs, like the wild hogs of prehistoric days.

The Henson farm exemplifies a side of conservation of which few people are aware. Whales, tigers, snail darters and other wild species have dominated the headlines so far, but not all endangered animals are wild. Around the world hundreds of breeds of livestock, seemingly outdated by more productive or specialized cousins, are just being left to die out.

Thousands of local races or breeds of domesticated animals evolved as Man carried his agricultural pursuits to the far corners of the world. Each had diverse features and qualities that suited the needs and environment of its area, and this process of increasing diversity continued for thousands of years. But in the present century as breeders learned genetics, reproductive physiology and other animal sciences, the trend was reversed. Animal breeders began concentrating on fewer and fewer races and breeds. So-called "superior breeds" began replacing the local animals that these breeds had often been derived from. Just like last-year's-model farm machinery, hundreds of breeds have come to be considered obsolete.

There is danger in this, for agriculture is not static. As technology, marketing, consumer preferences, fuel prices, national policies and scientific knowledge change, so agriculture changes too.

"The poultry industry is rapidly reaching the point where it is genetically vulnerable to disaster," notes Roy Crawford, a professor of poultry science at the University of Saskatchewan. "Virtually all broiler chickens are a cross of White Cornish and White Plymouth Rock, our laying chickens almost all come from closely related grandparent lines, and a single corpora-

Lyle G. McNeal

Silver-gray "old type" ram with four horns is one of the Navajo sheep in flock at Utah State University.

Joe Henson entertains vistors to his Cotswold Farm Park with a lively rarity—a Gloucester Old Spot piglet.

Photographs by Patrick Ward

Red Devon nuzzles Vermont farmer John Wheelock, who keeps a herd of these cattle alongside his Holsteins.

Joe Henson's rare cattle include Highland cow with calf, at right, and a Warwickshire longhorn in center.

tion supplies over half of the world market for turkeys. With such a narrow base, a genetic mistake could cause a catastrophe, as it did to the U.S. corn crop a few years ago. [In 1970, about 15 percent of the U.S. corn crop was wiped out by a leaf blight. It took three years to develop and distribute resistant seeds.] And without a store of genetic variability there can be no repairs and no progress."

The British are the first to grapple with the dangers of this situation, and a growing number of British landowners are beginning to pick up and protect the animal-breeder's genetic castoffs. Joe Henson has been at it longer than anyone. As only British farmers do, he sports a tie and tweed jacket as he mucks out a stall or hauls hay from a barn. Only manure-stained boots give him away. His father was a famous personality on the London music-hall stage and Joe himself speaks with an entertainer's animation and theatrical flair. "I'm perhaps the only person who fled the stage to become a farmer," he says with a chuckle.

Today his ancestry is catching up with him, however. Interest in rare livestock is so high that he and his daughter Elizabeth talk to young farmers, college students, women's groups, countryside clubs and conservation societies at least four times a week. And last

A red Belted Galloway is on the left, its black Belted Galloway mother partly visible at picture's far left.

year 120,000 tourists and schoolchildren came to see Joe's farm.

Such an outcome was undreamed of in 1971 when he and his partner bought a small collection of rare sheep and cattle—they were just trying to save the animals from slaughter when the Whipsnade Zoo needed space for more lions. "Ten years ago we were a voice in the wilderness, but today we're getting national support and attracting attention from all over the world," he explains. "People are getting interested because they can't personally do much to save rhinos or tigers, but they can protect cattle and sheep."

In 1974, Joe Henson helped establish The Rare Breeds Survival Trust—an unusual collection of animal lovers, farmers, researchers and conservationists dedicated to the protection and promotion of rare breeds. Among its diverse activities, the Trust monitors the status of threatened breeds, provides frozen semen of rare livestock, and holds an annual show and sale of rare breeds.

Michael Rosenberg, who administers the Trust, is something of a rare breed himself. A former New Jersey businessman with a resonant Yankee drawl and George V beard, he stumbled across the Rare Breeds Trust when he needed a few sheep to keep down the grass on his Devonshire estate. Later, he established a foundation with enough stock so that the interest income pays for some of the Trust's diverse operations. Today, he puts 40,000 miles a year on his Mercedes station wagon hauling around interesting animals and showing them at agricultural and country fairs.

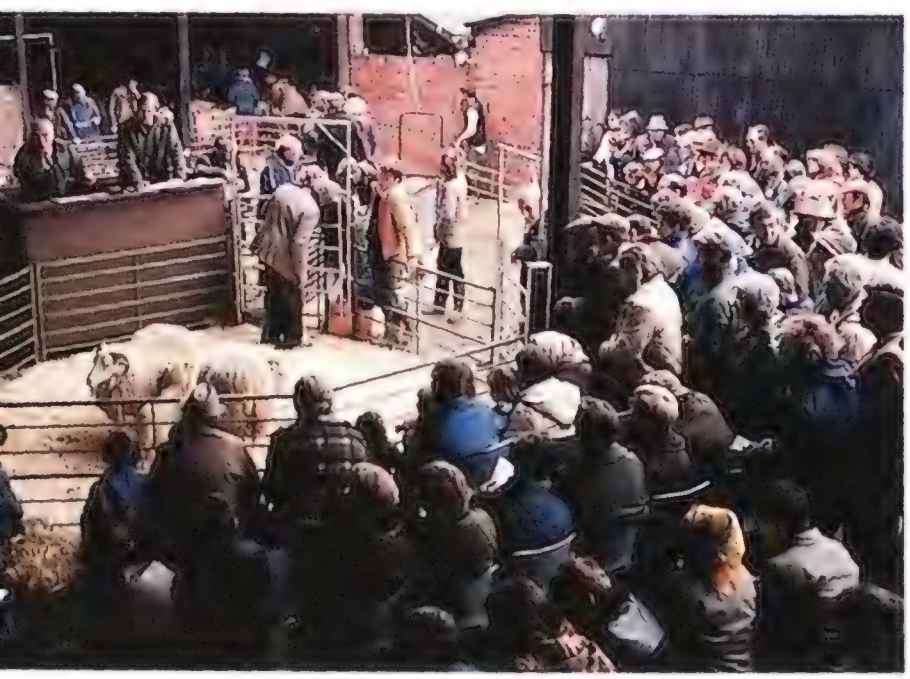
The idea of preserving livestock breeds has gained recognition more slowly on this side of the Atlantic than in Britain, despite the fact that North American livestock breeders concentrate on an even smaller number of breeds than the British. Today, for example, most of our cattle farmers are raising Herefords and Angus, or hybrids, for beef and Holsteins for dairy produce.

"Until fairly recently the rural landscape in America was rich in a diversity of livestock breeds," says Ridgway Shinn, one of the founders of the American Minor Breeds Conservancy (AMBC), a counterpart of the British Trust. "Many regions developed specific breeds for the climate, topography, needs and tastes of the people of that area." But as American agriculture became more industrialized, it developed highly specialized animals. Now a handful of breeds dominate the scene while the rest are threatened with extinction.

For instance, a decade ago 10,000 Tamworth pigs (p. 53) were registered annually in the United States; today, about 1,000. A few decades ago Ayrshires, Guernseys, Jerseys and Milking Shorthorns were major dairy breeds; today they are slowly being lost from American farms. In the 1860s Vermont's whole economy was based on a Merino sheep (p. 55) with wrinkly, folded skin. Now, in stark contrast, there are only two pure Vermont Merinos left.

Shaggy cow and calf are of West Highland breed dating to Iron Age and still found in the Scottish highlands.

Four-horned Jacob's ram belongs to a Mediterranean breed that may sport two, four or sometimes six horns.



Woodland White Face sheep is offered at rare-breeds sale at a farm in Trimpley Green, Worcestershire.

Shinn and the AMBC at Hardwick, Massachusetts, worry about breeds such as Tamworth pigs and Dexter cattle, as well as Cotswold, Lincoln Longwool, Vermont Merino and Jacob sheep (left). (There is also a Society for Preservation of Poultry Antiquities, whose members maintain endangered poultry breeds and varieties.)

The concept of the AMBC arose in 1978 when the staff at Old Sturbridge Village in Massachusetts were seeking an antique breed of cattle to increase the authenticity of this re-creation of a New England town circa 1800. The Red Devon cattle (p. 48) they wanted were the most common cattle type in 19th-century New England. They already had a pair and wanted to increase their herd. "We wrote to the departments of agriculture throughout the Northeast," Shinn explains, "but the responses came back saying: 'We never heard of them.' " Shinn and his colleagues eventually found a few of these quick, active beasts that had fortunately been preserved for use in ox-pull contests at agricultural shows.

The last of the Mule-footed hog

These conservationists have successfully located other disappearing breeds. One of them is the Mule-footed hog. A few years ago these pigs were popular enough to support a breed association; today very few animals remain—200 of them are on R. M. Holliday's farm near Louisiana, Missouri, and over the years he has shipped some animals to breeders in other states. They are peculiar in having a solid hoof, rather than the cloven hoof of all other pigs. Holliday raises them for sale at a market in St. Louis, but a chance epidemic could wipe out this uniquely American pig forever.

Another breed that is very much our own is the American Cream (p. 53), the only draft horse to originate in the United States. These big cream-colored horses have a white mane and tail, amber eyes and pink skin. "We thought the American Cream was extinct," reports Shinn, "but then we got a call from Karene Topp of Hubbard, Iowa, and learned that 20 animals still exist and that four farmers in three states have just pledged to work together in an attempt to protect the breed."

Many people have considered that such breeds were the waste products of the domestication process—a sort of genetic litter to be thrown away and quickly forgotten. But on both sides of the Atlantic the rare-breeds conservationists are showing that a surprising number of formerly obscure animals are remarkably useful. Indeed, some of these breeds are well on the comeback trail.

Once near extinction, the Texas Longhorn, for example, has bounced back in one of the most surpris-

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Saving endangered domestic breeds

ing resurgences in the American cattle industry (SMITHSONIAN, June 1974). Introduced by Spanish explorers, Longhorns were the dominant cattle in the American Southwest for centuries. Once there were millions of them, but in the early 1900s they began to be replaced by British breeds; their numbers dwindled to the point where only a few thousand survived. Then, 20 years ago, attitudes began to change. Ranchers with marginal grazing lands began recognizing that the Longhorns' hardiness, longevity and lack of calving difficulties were commercially valuable traits. Luckily, the federal government had maintained a few Longhorns on wildlife refuges in Oklahoma and Nebraska, and soon the Texas Longhorn was in widespread use in crossbreeding programs. By 1976, its numbers had increased to about 15,000, and today 62,000 are registered.

Another example of a rare breed's renaissance is that of the Finnish Landrace. In the 1960s, extinction threatened this sheep that Finnish farmers kept under their huts in winter to provide man and beast a little warmth. Then, by chance, a breeder learned that the ewes bear four or five lambs at a time, whereas conventional sheep produce only twins at most. Now the Finnish Landrace, not a wool producer itself, is used in many countries to improve sheep fertility: its genes are making the world's sheep more prolific and bringing down the cost of wool and lamb.

An example from the poultry industry is the Cornish chicken. Before the 1940s it was an obscure, neglected breed, its usefulness unsuspected. Today, as noted earlier, it is a vital component of most commercial broilers; its genes improve their growth, and our pocketbooks all benefit every time we buy chicken.

Noel Vietmeyer, of the National Academy of Sciences, wrote on boll weevils in SMITHSONIAN, *August 1982.*

Many breeds are obsolete because for most of this century livestock breeders have concentrated only on an animal's gross production. Holsteins, for example, are now the choice dairy animal because their milk production is huge. But in the future, gross production might not be the overriding factor. Ridgway Shinn thinks that the future is more likely to belong to the efficient; that animals which produce less will be selected if they can forage and do not have to be fed expensive rations. John Wheelock, for instance, uses Holsteins on his dairy farm in Colchester, Vermont, but one of his supposedly obsolete Devons is his top moneymaker. She produces less milk than the Holsteins but she eats much less grain and this makes her more profitable.

If the American livestock industry ever has to cut down on feed grain—as undoubtedly it will one day—and go back to feeding livestock on grass, then many old breeds such as these Devons will be once again in enormous demand. A sheep that may then be sought after is the Navajo (p. 47). Like the Longhorn cattle, the Navajo sheep were first brought here by Coronado when he was searching for the Seven Golden Cities of Cibola in 1540. It persisted in the Southwest, particularly among Indians who use the fleece in their traditional weaving.

"I have spent nine good years with these sheep," says Ingrid Painter of Redmond, Washington, "and I know that they are far more intelligent, as well as easier and more economical to keep, than any other breed here."

New interest in Navajo sheep

Her enthusiasm is echoed by Lyle McNeal of Utah State University: "Any ewe that is adaptable to the Southwest and can raise a lamb in that environment has to be superior! The maternal instinct is far stronger than that of any domestic breed. There's never a problem with lambing—we've never lost one." In the land of coyotes, aridity and searing heat, the traits of this breed seem too important to lose.

Many Navajo sheep are four-horned. (The Navajo Indians, who kept them for many years, believed that the multiple horns were sacred and they kept rams with this trait.) They have a double coat: coarse, long guard hairs on the outside; short, soft wool on the inside. The combination is outstanding for rug making and because it has little grease it does not get as dirty or shrink as much as normal wool.

These properties have led to a resurgence of interest in this distinctive fleece among women on the Navajo Reservation. (Museums are also interested in it for rug restoration because it closely resembles Navajo wool of the pre-1860s.) And appreciation for this wool

William Walczak

American Cream draft horses on William Walczak's farm in Sheboygan, Wisconsin, are among last of breed.

Our only native draft horse, American Cream was developed out of breeding program begun about 1935.

Jane Burton/Bruce Coleman, Inc.

Yawning sow is a Tamworth pig, a hardy variety which can fend for itself but does not produce large litters.

Peter G. Aitken/Photo Researchers

Rhode Island Red, a native American chicken, is still popular in Maine where its brown eggs are favored.

Michael Rosenberg presides over Trust's tent at Devon County show; Shetland ram in pen was Viking breed.

is spreading among hand spinners. A group of ranchers and weavers in the Chama Valley in northern New Mexico—themselves descended from early Spanish colonists—are making an effort to save the breed, which they call *Navajosa*, and bring back the wool. "We've got to save the things that supported people for centuries under our harsh conditions," says Maria Varela, a spokesman for the group. "It is ironic that the professionals who are supposed to know better have just looked down their noses at these sheep, while the sheep raisers somehow managed to hang on to a few remnants of the breed, generation to generation.

"This fleece spun up," she adds, "now commands $15 a pound, more than a lamb brings; in a poor community that's a resource that should not be lost."

"Demand for Navajo sheep is so great that not a week goes by without us getting requests," reports Professor McNeal. "But there are less than 400 on the Navajo Reservation and that's the largest group left."

For years McNeal has been working with the Navajo to reintroduce the breed and to undo a skein of distrust. This began in 1863 when Kit Carson dispossessed the Navajo of most of their livestock; enmity was bolstered in the 1940s when federal agents indiscriminately shot hundreds of thousands of sheep, claiming that erosion caused by overgrazing would silt up the Hoover Dam; then, in 1967, the U.S. Department of Agriculture relocated the sheep-research facility from the Navajo Reservation to Nebraska, taking with them Navajo animals that had been improved.

Many old and rare breeds have a hardiness and stamina not found in the standard animals used for commercial food production. And some of the rare breeds are proving useful in specialized situations.

For example, Soay sheep—descendants of the first domestic sheep from the Scottish isles of Soay and Hirta—already have found a use grazing the 25 square miles of spoil dumps near the china-clay pits in Cornwall. These great mounds of moonscapelike muck were formerly classified unsuitable for agriculture, but now the little antique sheep is proving ideal for grazing their thin grass. They are light enough not to scar the unstable china-clay spoil and create erosion. Moreover, they are thought to be the only sheep with immunity to foot rot, a major sheep disease. "We run them with breeds that all get foot rot," Joe Henson reports, "but they remain unaffected. If we could introduce that to the national flock we'd save the country millions!"

Unfortunately, animal scientists around the world do not have easy access to rare breeds such as Soay sheep. Shipping livestock from country to country is not as easy as shipping seeds; and animal breeders, unlike plant breeders, cannot simply turn to a bank of germ plasm. Whereas an agronomist may test several hundred strains of a crop to see which best suits his location, a livestock specialist more than likely spends his whole career with just one breed.

That situation may soon change dramatically. One of genetic engineering's first benefits for animal science seems likely to be embryo transplantation technology. In this process, multiple eggs (produced by stimulating female animals hormonally) are fertilized and transplanted to surrogate mothers.

Because embryos are thought to be free of many diseases, their shipment between nations may soon be permitted. Although this freedom from disease is not yet confirmed, embryo transplants may revolutionize world utilization of rare livestock. The tiny bundles of cells can be frozen and stored or air freighted cheaply in small, insulated containers. They may vastly simplify the worldwide exchange of animal genetic material and become the livestock counterpart of exchanging seeds. If that happens, then today's rare breeds will likely contribute greatly to tomorrow's agriculture. The Texas Longhorn, the Cornish chicken and the Finnish Landrace sheep could be merely the forerunners of a global reordering of our livestock resources.

Minor breeds need to be maintained in sufficient numbers simply so that their unique genetic material is available for such future use. The variety and diversity of genetic properties maintained in these breeds is one of agriculture's invaluable resources.

Joe Henson sums up his work in more immediate and personal terms. "This is the most satisfying thing you can do as a farmer," he says. "Besides producing lamb chops we are doing something worthwhile for the world's future!"

Vermont Merino sheep at Old Sturbridge Village are hybrids; only two pure Vermont Merinos remain.

By Robert Wernick

Fairy-tale chateau restores life to a mysterious past

A magnificent monument to failed ambition, France's fabled Vaux-le-Vicomte is a rambling domain where ghosts walk and tourists gawk

Poor Nicolas Fouquet: after his lavish housewarming, Vaux's creator spent the rest of his life behind bars.

It was supposed to be the grandest housewarming in history and, from the moment the first gilded coaches and beribboned horsemen came thundering up the road from Fontainebleau to the great wrought-iron gates, the host knew that his plan would succeed beyond even his soaring hopes. The host was Nicolas Fouquet, Superintendent of the Finances of France, the richest and most powerful subject of the young King Louis XIV. With his new chateau, he was going to offer the king and the world a supreme example of what riches and power could do in the realms of beauty and taste and well-tempered magnificence.

Originally, there had been an old feudal castle called Vaux-le-Vicomte on this spot where two valleys meet, together with a couple of peasant villages, some wheat fields, pastures, swamps and woods, and a river. Then an army of 18,000 men was brought here, furnished with barracks, workshops and a hospital. They were the best craftsmen to be found in the world: masons, carpenters, painters, carvers, gardeners, cabinetmakers, tapestry weavers, bricklayers, hydraulic engineers. All the material they asked for was handed over to them without stint: tons of marble for mantelpieces and pedestals and busts; tons of lead for the water pipes; acres of slate for the roofs; the finest woods; the finest textiles. For four and a half years, they were steadily at work. They tore down the old buildings, leveled the hills, diverted the river and built a great new chateau with three-foot-thick stone walls and spacious brick outbuildings, the whole set in an immense terraced garden. In the late afternoon of August 17, 1661, the work was as good as done. Vaux (a French word for valleys) was ready to be shown off.

It took nearly five years and 18,000 workers to build Vaux, but only one night for it to raise a king's ire.

Fouquet, opening the door of the king's carriage and escorting him up the monumental steps to the front entrance, could hear the chorus of admiration and envy rising behind him. The king, the queen mother, the king's mistress, the dukes and duchesses and bishops, the hundreds of nobles and hangers-on who made up the court, all had to agree that they had never seen a building like this.

Many of France's older chateaus were originally built around central courtyards for defensive purposes. Over the centuries, those castles were expanded in helter-skelter fashion, with each generation of occupants adding different features. Vaux, on the other hand, was built all of a piece from a unified design conceived by the noted architect Louis Le Vau. It was not a warlike fortification but a huge country mansion, open and inviting, designed for entertainment on the largest possible scale. The surrounding moat re-

Photographs by Pierre Boulat

On domed ceiling of Vaux's Grand Salon, bird flies over equestrian statue of Louis XIV by Girardon.

flected the golden ochre tones which had been applied in a light patina over the walls.

As the ladies in their brocaded gowns and the gentlemen with their swords eagerly passed from room to room—including a spectacularly ornate bedroom designed specifically for the king—they were presented everywhere with a series of dazzling delights. The interior had been designed and executed by Charles Le Brun, a painter fresh from years in Italy, and he left a touch of sparkling luxurious elegance on everything: the 250 tapestries, the painted wall panels and gilded moldings, the carved and embroidered furniture, the chandeliers, the busts of Roman emperors.

All through the decorations a keen eye could see prancing a pack of little painted and carved squirrels: *fouquet* was the word for squirrel in the patois of the superintendent's native province. And weaving among the squirrels were scrolls carrying his motto, *Quo non ascendet?* How high will he not climb?

From the windows and the terrace on the far side of the building, the south side, the guests saw stretched out before them as far as the eye could see a splendid garden of a new design. Traditional French gardens had been little cooped-up lots, surrounded by walls or hedges. This one was a man-made landscape in which everything, including the chateau, was integrated. The king reportedly told designer André Le Nôtre that he knew "how to domesticate nature."

Bisques at the start, bangs at the end

All of the senses were meant to be surfeited. The scent of orange trees in wooden tubs filled the grounds. Servants kept up a steady flow of pheasants, ortolans, pâtés, bisques, pastries, all prepared under the supervision of Vatel, greatest maître d'hôtel of the age. (He would later commit suicide when a fresh fish he had promised to the Prince of Condé did not arrive in time; but at Vaux everything went swimmingly.) Violinists played airs specially written for the occasion by Jean Baptiste Lully, the most fashionable composer of the day. There was a play specially written for the occasion by Molière, with Molière himself to act in it. There was a lottery in which every guest won a prize of some sort—jewels, horses, swords, paintings.

The guests could not tear themselves away till two in the morning. As they were preparing to go, a last dazzling burst of fireworks lit up the whole chateau in a gigantic blaze. With that, two horses harnessed to the carriage of Queen Mother Anne of Austria reared in terror, plunged into the moat and drowned.

"La Fête de Vaux," as the celebration was called, was meant not only to inspire superlatives; it had a political purpose as well. Fouquet was a man of infinite energy, charm, resources, wit and ambition. For

With its opulent furnishings, raised bed and gilded balustrade, Louis' bedroom was fit for a king but, in fact, he never slept there. Le Brun's ceiling art is an allegory, *Time Bearing Truth Upward to Heaven.*

years, at first under the wily eye of Cardinal Mazarin, the chief minister, and for the last five months on his own, he had been in effective charge of the nation's finances. The nation was hard pressed after years of anarchy and war, and it took an almost miraculous skill in juggling figures, wheedling investors, speculating and peculating, to produce the daily supplies of cash needed to pay the army and the civil servants, and keep the king and court living in suitable luxury—as well as fill the capacious pockets of the cardinal (one of the greediest men who ever lived) and of Fouquet himself, the aspiring squirrel. Thanks to his skill, and Mazarin's, France had been able to survive the years of calamity and was now at peace, aspiring to become the mightiest of European nations.

King Louis had announced, after the death of Mazarin, that he intended to take over personal direction of his government, but no one took him seriously. His mother shrugged her shoulders when she heard of it. Fouquet was certain that His Majesty, a hot-blooded boy whose main interests seemed to be chasing stags and skirts, would tire of business in a few weeks and leave the running of the country to him. The festivities at Vaux were intended to show the king just how well qualified Fouquet was to lead.

Rarely has a brilliant man made a more foolish error in judgment. Louis was deeply serious about how he was going to reign (and as he did indeed reign for the next 50 years). He was impressed by the fête, as its creator had intended, but beneath the smiling exterior he knew how to maintain on all occasions, he was boiling with rage. For some time he had been poring over the account books of the state, and Jean Baptiste Colbert, who had only recently become Fouquet's second-in-command, had been showing him in detail how enormous streams of public money—*his* money—were pouring into the superintendent's hands. He himself was always running short of cash when he wanted to add a wing to his palace, the Louvre, and here was his servant, his creature, giving him lessons in luxury.

Three weeks after Louis left Vaux, he summoned Fouquet. Having just borrowed 88,000 *livres* from the superintendent to meet the payroll of his navy, the king, with customary courtesy, greeted him, shuffled through some papers and then bade him a polite farewell—only to have him arrested by the Chevalier d'Artagnan, lieutenant of the musketeers, and driven off to the first of the dungeons in which he was to spend the rest of his life.

Vaux, which had come fully to life for one glorious evening, was left to wither in obscurity. No one went to visit it, and most of the precious furnishings and decorations were taken away. The king himself appropriated much, including the statues in the garden and the orange trees. According to the present owner of the property, Colbert acquired a magnificent collection of tapestries, and had the squirrels taken out of them and his own emblem stitched in—the *couleuvre*, or snake in the grass. The tapestry workshops were moved to Paris, where they have kept working ever since, under the name of the Gobelins.

All the creative spirits who had worked on Vaux were taken away, too. The king had seen, in this grand and lovely ensemble, a model for what he sought: an overwhelmingly visible symbol of his own greatness. He had long had the idea of enlarging the hunting lodge his father had built in the little village of Versailles. Now he swept up all of Fouquet's establishment —Le Vau and Le Brun and Le Nôtre, plus a whole

Gleaming in the afternoon sunlight, Vaux-le-Vicomte resembles a toy castle in dramatic view from the south.

Robert Wernick has written recently for SMITHSONIAN *about goats, Roquefort cheese and artist Milton Avery. He maintains homes in both Georgia and Paris.*

Fountain, gardens, outbuildings occupy 1,200 acres of parkland—a fraction of Fouquet's original holdings.

troop of craftsmen—and put them to work creating a great palace which would be the principal monument of his reign. From that day to this, the mighty of this world have taken Versailles as a benchmark against which to measure their own efforts at magnificence.

They could never quite equal the original, however. For lovers of Vaux, even Versailles has never been more than a botched imitation. It is too big and too self-conscious. Le Brun, who was lively and inventive when left alone by Fouquet, became terribly formal and academic at Versailles, where he had to work under the constant eye of the king.

Versailles, of course, became the seat of the French government, and over the years it was remodeled so often that today it is something of a caricature of its original state. Not so Vaux-le-Vicomte. It remains basically unchanged since that magical August night in 1661 and therefore embodies the melancholy fascination of an enchanted castle in a fairy tale, where a wicked fairy stopped all motion at a stroke of the clock. It has not survived without the vicissitudes of time, however. The house was empty for only a few years after Fouquet's disgrace. The king, though ferociously unforgiving to the man, did not let his rancor spill over onto the family. He eventually let Mme Fouquet move back in. She was a courageous and accomplished woman who soon got things back into working order. But she could not bear the memories, and eventually sold the place to Marshal de Villars, one of Louis' more successful generals. His son in turn sold it to another noble family, that of the Duke of Choiseul-Praslin, who kept it for a hundred years. But then, in 1847, there was a dreadful scandal when the duke murdered his wife and killed himself. Disgraced, the family left the chateau dark and shuttered for decades.

A sugar king's sweet dream comes true

In 1875, a young man named Alfred Sommier, who had made a fortune in sugar, was looking for a home within commuting distance of Paris to replace the one which the Germans had destroyed during the Franco-Prussian War five years earlier. He was a lover of beautiful things, and he fell passionately in love with this beautiful house. He bought it and spent the rest of his life restoring it to something like its original state. The walls were solid but the floor beams were rotting, and he replaced them with girders like those used to build the Eiffel Tower. The gardens had reverted to hayfields, and the huge lead water pipes had been sold. But detailed plans and drawings still survived from the 17th century, and with their help everything could be restored, down to the last clump of box.

Sommier let the Choiseuls take away all their fashionable Louis XVI furniture and haunted auction rooms for examples of the older, statelier Louis XIV style. At one auction he found himself bidding for the archives of the Marshal de Villars against a Marquis de Vogüé, who was a descendant of Villars' sister. A mutual friend later introduced them at a club, and the social-climbing esthete and the aristocrat decided to join forces. Sommier bought the papers, lent some of them to the marquis, and in the course of time married off one of his daughters to one of the marquis' sons. Their grandchild is the current owner of the estate, Count Patrice de Vogüé (p. 64).

Like his great-grandfather, the count has given up almost everything else in life for Vaux-le-Vicomte. "It is a house worth going crazy for," he says. "I understand perfectly why Fouquet took leave of his senses here. When you start on something like this, you have to finish it, no matter what the consequences." When

Desk by Teuné in room named for La Fontaine, writer of fables. Fouquet was one of author's early patrons.

he inherited the property, he was "too proud to sell the greatest house in Europe." In 1968, he opened the garden and the ground floor to public visits. He and his family moved into an apartment in what had once been a sheep barn. The stables were made over into a carriage museum, where the horse-drawn vehicles of three centuries are lined up brightly painted and polished. In April 1984, the rooms of the upper floor will be open to visitors, too. Fouquet's bed is currently being re-created for one of these rooms. On the walls will be four tapestries that de Vogüé found at an auction in London last year: 17th-century copies of originals plundered by the king.

Vaux has become a major tourist attraction; more than a quarter of a million people troop through the gilded halls and the immaculate gardens every year. They like not only the glitter and the grandeur, but the more workaday air of the rooms in the basement: the kitchen and pantries and wine cellar, and rooms for wood cutting and silver polishing and sewing and washing and all the activities that kept the luxurious life upstairs in motion. On Saturday nights in the summer, the whole building is lit with a thousand candles, and the light, so much softer and richer than electricity, helps to conjure up a vanished past. "I want ghosts to walk here," says de Vogüé.

It is the ghosts who make this chateau unique and explain its hold on visitors. Crowds making the tour of the house always linger in the basement by glass cases which fill out Fouquet's unhappy story. He was dragged through a rigged trial which lasted three years before the judges, under shameless pressure from the king and Colbert, found him guilty of a variety of crimes. He was condemned to confiscation of his property and banishment, but the king, outraged that the death sentence had been withheld, intervened and sent Fouquet to prison for the rest of his life.

Did Fouquet get a raw deal from history?

Disappointed in his thirst for blood, Louis at least had the satisfaction of seeing Fouquet go down in the public record as a thief and a waster of the public substance. This verdict has been repeated by generations of historians, who have treated Fouquet as a brilliant but dishonest megalomaniac whom Louis was well-advised to replace with the honest, hardworking Colbert, who restored the economy of France. Recently, scholar Daniel Dessert has checked into the original records and his research seems to indicate that Fouquet has been getting a very raw deal from the historians. It is true that he had a colossal fortune of some 15 million *livres* when he was arrested. His debts were about the same—but most of them were incurred to pay off the king's pressing bills. Dessert suggests that one reason

for building Vaux was to reinforce the public delusion that Fouquet was boundlessly rich. Wary investors at that time would not put out a *sou* for a government bond unless it was countersigned by Fouquet; they assumed he would back up the otherwise worthless paper with the very real property that he so ostentatiously commanded.

According to de Vogüé, the final answers to the questions about the relative criminality of all these great men are locked up in the private papers of Colbert. Unfortunately they are still in the possession of Colbert's descendants, who apparently do not choose to make them available to researchers suspected of a prejudice in favor of the wicked Fouquet.

As for the wicked Fouquet himself, it did him little good to know that he had been wrongfully accused and judged. The cold vengeance of the king carried him off to a dark dungeon in the gloomy, wind-buffeted fortress of Pignerol in the Alps. There, with scant pen or ink or paper, the lower halves of his windows covered with blinds so that he could not send signals to some hypothetical friend in the mountains, suffering from sciatica and liver trouble and fever and piles, he lived on for more than 15 years.

Even in the 17th century this was considered cruel and unusual punishment, and there has been much speculation about the king's obstinate insistence on

High-climbing squirrels, Nicolas Fouquet's emblem, and castle, his wife's, are prominent mural decoration.

Ornate silver-plated basin attests to the elegant life-style Vaux-le-Vicomte was designed to celebrate.

On ceiling of king's bedroom, three-dimensional stucco figures gambol about painting of contesting warriors.

Rendering hangs at Vaux of romantic Man in the Iron Mask, Fouquet's supposed prison mate at Pignerol.

At oars, Vaux-owner Count Patrice de Vogüé points out winter damage in estate's Grand Canal to a visitor.

keeping Fouquet locked up when he was offering pardons to others who had been convicted of fiscal fraud. Although the usual explanation has to do with politics and ambition, another tempting theory is that Fouquet—who at the time of his power knew *everything*—knew some secret so horrifying or so shameful that the king could not bear the thought of his ever being able to divulge it. If this was the case, the king's cruelty was very efficacious; for no one has the slightest idea what the secret might have been.

It is hard, though, not to associate the secret with another great mystery surrounding another prisoner who supposedly was at Pignerol during the years Fouquet was there. This was the storied Man in the Iron Mask (left), who, or so it is said, lived under strict guard in a variety of prisons until he died in the Bastille in 1703. As legend has it, more money was spent on his incarceration than for any other prisoner of the French monarchy, and his guards were under orders to kill him the moment anyone saw his bare face, which no one ever did. Louis XIV is said to have revealed, on his deathbed, the prisoner's identity to his great-grandson Louis XV, and Louis XV in turn to his grandson Louis XVI, but the latter took the secret to the guillotine during the French Revolution.

Speculation has raged for 300 years over the question of who the wretched man might have been. Candidates have ranged from a bastard son of Anne of Austria, by Mazarin or the Duke of Buckingham, to none other than Fouquet himself. In his swashbuckling novel, *The Man in the Iron Mask*, Alexandre Dumas the elder identified the prisoner as the twin brother of Louis XIV. Dumas invented a plot to abduct the king at the Fête de Vaux and substitute for him the twin, who was friendly to Fouquet.

The mysterious tale enhances the aura of romance that softens the formal perfection of Vaux-le-Vicomte. Especially when the light is dim, at sunset or when the fog settles in, the whole sad story of Fouquet, his greatness and his fall, seems to haunt the stones. Other chateaus have seen more noble and world-shaking actions, but at Vaux nothing ever happened, except that one fatal grand entertainment. Wars and revolutions have passed it by. The only time its alarm system has gone off was when several hundred thousand insects from a nearby forest flew in great clouds toward the candlelit windows and disturbed the infrared sensors. All this magnificence, built for great ends that came to naught overnight, is impregnated with the sweet melancholy of the might-have-been.

Set in flowery splendor for revelers who never arrive, the dining room embodies Vaux's poignant air.

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By Donna Lauren Gold

Plucky puppets are the stars in one family's saga

From Sicily to the New World, generations of Manteos have performed a centuries-old romantic epic with their life-size marionettes

"Papa" Mike Manteo constructs new marionettes to add to a family collection that includes about 200.

A stage has been erected in a side room at the American Museum of Natural History in New York City. The crowd sits hushed in front of the richly painted platform. The curtain rises. A stiff-legged marionette in gleaming armor strides onstage, a feathered plume falling across his wooden face. With grand gesture of sword and arm, the knight proclaims in Italian:

> Angelica, Angelica, my dearest, where are you?
> I've looked everywhere—where is she?
> I've gone through forests and kingdoms,
> And cannot find her. Has she abandoned me?

Backstage "Papa" Mike Manteo is calling out the words, while his sister Aida plays the piano. Tucked behind the stage, sitting cross-legged on the floor, is Michael Manteo, Pino Manteo's boy and Papa Mike's youngest grandchild. On the bridge handling the life-size marionettes, Pino works with his uncles. Several cousins pass the heavy puppets up to the handlers.

The curtain falls. With tears in her aging eyes, Aida plays the finale for a moment longer, then she joins the others in front of the stage. Surrounded by three generations of Manteos and the puppets, Mike talks to the audience. "Without the crew," he says, "there would never be a show. There will always be a family."

During rehearsal, dueling knights leap into the air as Domingo (left) and Pino manipulate them from above.

The Manteo saga began when Agrippino Manteo, orphaned at a young age, fell in love with marionette shows in Catania, Sicily. He worked with the puppeteers and vowed to have his own troupe one day. Indeed, when he married and became a father he moved his family to Mendoza, Argentina, in the early 1900s, where he performed in a puppet theater set up behind his bakery. In 1919 the Manteo family emigrated to New York City, where they finally established their *opera dei pupi*—known as "Papa Manteo's Life-Sized Marionettes"—at 109 Mulberry Street.

From southern Italy to the New World, the Manteo family had been performing the chivalric episodes of *Orlando Furioso*. It is derived from the French *Song of Roland*, and was put into verse by the 16th-century Italian poet Ludovico Ariosto. His story is based on the exploits of Orlando, knight of Carlomagno (Charlemagne), defender of the faith and lover of Angelica, who marries someone else. The grief-stricken Orlando goes mad (*furioso*), and wanders through the countryside dragging a dead mare by one leg.

As the Manteo family played their marionettes through the saga, Orlando and his compatriots, Rinaldo and Oliviero, met with saints and pagans, dwarfs and giants, dragons and sorcerers; they also had a goodly share of passionate romance with fair damsels, some of whom were also warriors. The puppeteers improvised from Ariosto's text, ending each performance at the height of suspense to ensure their audience's return the following night. In the show Orlando al-

Photographs by Martha Cooper

Pino carries 90-pound marionette from his father's Brooklyn workshop, now used primarily for puppets.

Puppets onstage during a performance of *Orlando Furioso* are (from left): Carlomagno (Charlemagne);

ways died last, blowing on a horn in a desperate attempt to summon help, while blood spurted from his eyes, ears, mouth—a high point in the Orlando cycle, staged with a specially designed Orlando puppet head and beet juice for blood. Sometimes the cries of the puppeteers were drowned out by the real cries of the audience. The Manteos' version of *Orlando Furioso* lasted 394 episodes.

Ariosto based his epic on the legend of Roland, which celebrates a true incident at the pass of Roncesvalles in the Pyrenees in A.D. 778. According to the legend, the Christians had fought the Saracens in Spain and were returning to their native France when one of their own men, Count Ganelon, betrayed them, sending the enemy to slaughter the knights while they were trapped within the narrow pass. There, Roland (Orlando) and Oliver (Oliviero) are said to have met their end. Historically, the incident at Roncesvalles was only a minor skirmish, and it was probably the Basques, not the Saracens, who ambushed the soldiers. But centuries later, the incident was recalled as one of Charlemagne's great battles for the faith, and so the chivalrous legend of Roland flourished.

The Sicilian audiences knew the stories as well as the puppeteers did, supplying pungent comments if a puppeteer faltered. In New York, where several marionette theaters performed, the immigrants would flock to the shows to watch the tales of their childhood, for the moment forgetting the confusing new world of sweatshops and tenements they had entered.

Eventually Americanization and immigration quotas took their toll. The old chivalrous stories were supplanted by the more contemporary celluloid myths. Some second-generation Italians were not as familiar with the language, nor had they the blood memory of the stories. Though old-timers came, their children did not. One by one the marionette theaters closed, their audiences depleted.

As the other theaters gave up, Agrippino Manteo

Articles by free-lance writer Donna Lauren Gold have appeared in Natural History *and* New York.

Alda La Bella; Alessandro (a knight); bold hero of the epic, Orlando; and the menacing giant Morgante.

bought their marionettes. With his sons and daughter to assist with the puppets, and a family electrical business to help support it, "Papa Manteo's Life-Sized Marionettes" was the last theater running. For a time, celebrities and society folk came to see them, brought by Tony Sarg, the famous puppeteer of the '20s and '30s. The Manteos might perform twice, once for the Italians and again, says Papa Mike, for the likes of Dorothy Gish and Irving Thalberg, who had made the little theater one of their highlights whenever they would go slumming.

For the uninitiated, a 1929 *Theatre Arts Monthly* issue ran directions to the theater. "If you are starting from China Town," wrote George Tichenor, "go up Mott Street to Canal and then a block over to [109] Mulberry. . . . Inside is a jovial ribald audience which spits on the floor, whacks one another on the back, laughs long and quite uproariously, an audience of strong emotions rather than nice, which grapples, devours and swallows anachronistic settings, great gulps of passion and endless stage brawls."

In 1938, when 18-year-old Johnny, the pet of the family, was dying of tuberculosis, Agrippino was inconsolable. When he closed his theater, it seemed the end of an era.

But puppets had become the Manteo birthright and even death could not daunt them. Agrippino passed the puppets on to his eldest son, Mike. After Agrippino died, Mike took over as "Papa" Manteo, occasionally performing in schools and churches for the Italian community. Today, though still without a permanent theater, Papa Mike is grooming his eldest son, Pino, to run the show. And Pino looks to the rest of the family, including his son Michael, five years old. "He's got good hands," Pino observes.

"If one of the heroes dies, I feel bad"

"Why do we love it?" asks Mike. "I don't know. If I ask you what makes people go into drugs—you find life monotonous, you find life dull, you want excitement? I got all the excitement I need with the marionettes. And then the stories, they're so intricate. When I manipulate the puppets I get interested. And if one of the heroes dies, and I have to kill him, you know I feel bad. I live the stories still. . . . A knight is onstage and my father is giving out the voices."

Mike Manteo is a large man, with strong features carved into his thick face. At 73, he has the energy and mischievous clowning manner of an oversize child. While Mike's passions lead to the dramatic, his sister Aida celebrates the tragic, as if the world were one great, sad story. Her head bent to one side, wearing thick glasses beneath red hair, Aida's response to any emotion is tears. Aida and Mike inevitably improvise a dialogue when they talk, creating scenes as if they were still onstage.

Though the Manteos perform only sporadically now, Mike is often at his workshop repairing old puppets and constructing new ones. The bodies of the puppets are carved out of wood, then padded with soft materials. Later Aida dresses them in satin and velvet. The puppets, which can weigh close to 100 pounds, are manipulated from a bridge above the stage by means of upright iron rods—one through the body that hooks to one through the head. The hook can be detached during the performance, allowing for death by decapitation, a favorite method of execution. They gesture and fight with the aid of a thinner rod that holds the right (sword-wielding) arm and a thick string that holds the left arm. But when the puppets fight, which is every few scenes, they make no pretense at remaining stage-bound: they go at each other like pendulums swinging in midair.

As Papa Mike recalls the early days in New York: "They may be marionettes, but when somebody died,

Pino Manteo uses all of his strength as he struggles with puppets who are fighting a no-holds-barred battle.

and my father and my sister would put on a beautiful scene—with such sadness, my father crying, my sister crying, and the people—you could hear them sniffle, too." He sniffles. "Beautiful. You see, you forget they're marionettes, you think you're looking at the real thing. One night, it was very exciting, and 'one of the boys' that happened to be in the audience, he gets mad, he draws out his gun and takes two potshots at the marionette—two shots! Could 'a' hit me in the shins."

Still, performances are calmer now than they used to be, and neighbors near Mike's Brooklyn workshop help out with costumes by leaving broken appliances and old clothing on his doorstep. Some of today's marionettes have shiny new breast plates made from toasters or hubcaps since, as in any battle, the knights' armor gets scarred and dented in the heat of the fray.

A second Manteo grandson, also named Michael, sometimes joins his grandfather in the workshop. "They're my pride and joy," he comments. "I love them, my grandfather loves them—it's our tradition, a family tradition. I used to make little puppets and take them to school with me. It made me feel special, prouder, to have the marionettes. Now we go to the workshop and he sits at his bench and I sit at mine and we go to work on the puppets."

In June, Papa Mike Manteo received a National Heritage Fellowship for an outstanding contribution to American culture. An exhibition at the National Museum of American History, entitled "Our National Heritage: The National Endowment for the Arts' National Heritage Fellowships," features a Manteo marionette—one of Charlemagne's knights called Agricane di Taria—and an original backdrop handpainted by Agrippino Manteo in 1923. (The exhibit closes September 6.) The Manteos have also performed at the Smithsonian's Festival of American Folklife.

Reflecting on why this French chivalric legend came to be so important to the southern Italian island of Sicily and its transplanted American population, Pino says: "Orlando was a superman. Superman flies; Orlando has Durlindana, his magic sword. Orlando has the Achilles heel, Superman has kryptonite. There was no Superman back in the 19th century and there is no chivalry now. The people would come every night to watch the good guy give it to the bad."

And every night Mike, Aida, their brothers and their father would be sure that the bad guy got it good.

"For me they are like bread and wine, *sono cose come pane e vino per me*," adds Aida. "I know the stories since I am four years old."

Learning family tradition, five-year-old Michael gets some pointers from his grandfather, Papa Mike.

By Kent H. Redford

Curious creatures to whom the ant is *la haute cuisine*

Throughout the tropics, animal specialists like the aardvark, the echidna and the numbat subsist mainly on relatives of picnic pests

Rolled like a pincushion with only claws and snout protruding, an echidna presents formidable defense.

One day recently I picked up a few termites and ate them, wondering at their widespread appeal. These particular ones proved to be dry and hard and with a faintly resinous aftertaste; in fact, I have yet to eat ants or termites that tasted good raw. My opinion notwithstanding, these insects are the preferred food of some of the most unusual animals alive today: the myrmecophagous (ant- and termite-eating) mammals. This group includes anteaters, armadillos, pangolins, the aardwolf, echidnas, the numbat and, beloved of crossword-puzzle addicts and amateur poets, the aardvark. With the exception of armadillos and anteaters, these mammals are not closely related, sharing only a common passion for ants and termites. For a long time termites were called "white ants," and so the descriptive name "anteater" was used to refer to both ant- and termite-eating mammals. Most myrmecophagous mammals eat both, although some species appear to restrict themselves to one or the other.

Only 22 mammals can be considered true ant and termite eaters: not many out of the 4,170 known species. This is particularly striking when one considers that in some areas ants and termites comprise up to 75 percent of the total animal biomass. In fact, the number of individual ants and termites alive at this moment is greater than the number of all humans who have ever lived. That is a lot of potential food. Where you find a lot of ants or termites you usually find one of these curious predators.

Each of the world's tropical areas has its own anteaters. In South and Central America, where I spent two and a half years, anteaters share the myrmecophagous niche with a variety of armadillos. The anteaters range from the giant at 100 pounds or so down to the pygmy at about a pound. Armadillos, which range from Kansas and Missouri to Argentina, are unique in the mammal world in possessing a hardened shell made of bony plates and teeth with no enamel.

Africa has the most myrmecophages. The aardvark is a heavy-bodied digging machine with a penchant for turning somersaults before entering its burrow. The aardwolf, on the other hand, is a degenerate termite-eating hyena. Then there are four species of pangolins, which resemble toothless, living pinecones, covered with scales. Another three species occupy the myrmecophagous niche in Asia. Like aardvarks, pangolins have no living relatives.

Australia, an island continent where evolution has marched to the beat of a different drummer, has produced its own versions of anteating mammals. The echidna, or spiny anteater, is related to the platypus, while the second Australian myrmecophage, related to the American opossum, is the marsupial numbat, or banded anteater, a creature of the eucalyptus forests.

The practice of eating ants and termites differs from

The silky anteater spends its nights seeking ants in tropical forests from southern Mexico to Brazil.

eating other insects in important ways. The key to the difference lies partially in the existence of different castes of ants and termites specialized for different tasks. There are two sterile castes: workers for gathering food and building the nest, and soldiers for defending the colony. As nonreproductive defenders of the colony, soldier ants and termites demonstrate a remarkable range of antipredator behaviors. Termites, to a much greater degree than ants, have a soldier caste highly specialized for colony defense, a caste that has been called one of "nightmarish monsters, which recall the most fantastic revelries of Hieronymus Bosch, Bruegel the Elder and Callot." This nightmarish quality arises from the strange shapes into which soldier-termite heads have been contorted in developing different forms of colony defense. Many of these forms involve chemical secretions. This sort of chemical warfare has reached its apogee in termite soldiers that spray their predators with sticky, repellent and sometimes toxic compounds from a nozzle-shaped head.

Monstrous soldiers notwithstanding, termites and ants are eaten by mammals, and eaten in great numbers: an estimated 124,000 termites were found in one South African aardwolf stomach.

It is hard to pick up this many swarming insects one by one, as I can attest after spending many weeks trying. Most anteaters would agree; they gave up long ago. Teeth and the precision they allow have been traded for tongues: relatively long, mobile tongues and large salivary glands to keep them moist are trademarks of this group of mammals. A pangolin tongue is so long that one end is attached to the pelvis. These long tongues can be manipulated very rapidly; I have estimated a giant anteater's to flick in and out faster than twice a second. The tongue can be extended 18 inches and drips with saliva as it sweeps through termite galleries securing hapless insects.

Those myrmecophages that still have teeth appear to be losing them. Most of the grinding action of the teeth has been taken over by heavily muscularized portions of the stomach, or, in the case of the echidna, by pseudoteeth located on the tongue. Teeth may also have been lost or become nonfunctional because so much earth is taken in by the sticky tongue as it picks up ants and termites. As much as 47 percent of the contents of aardvark stomachs has been reported as sand, an observation common to all ant and termite eaters. If this abrasive material were ground between chewing teeth, it would rapidly wear down the enamel.

Most of the myrmecophagous mammals are diggers;

Kent H. Redford, who has just received his doctorate from Harvard, will soon be at the University of Florida researching mammals and the insects they eat.

Until baby can take care of itself, this giant anteater will carry it on its back wherever it goes.

Found in different habitats from Belize to northern Argentina, the animal spends most of its time feeding.

Pangolins, found in Africa and Asia, at times curl into ball when threatened. They can raise sharp scales.

A shuffler, the collared anteater is equally at home feasting on ants and termites in trees or on the ground.

virtually all the terrestrial forms live in holes excavated by themselves or other animals. The giant armadillo, giant pangolin and aardvark are immensely powerful diggers. The burrow system of the aardvark appears to be the most extensive of any of these animals. A gruesome story is told of three Africans who went down an aardvark burrow and disappeared. Their friends started digging for them, but gave up after having excavated a labyrinth 18 feet below ground. The echidna and naked-tailed armadillo, though smaller, are powerful diggers; I have seen a two-pound armadillo completely bury itself in hard ground in less than 30 seconds. These strong diggers all seem to obtain the majority of their ant and termite prey from colonies they excavate, often feeding for long periods of time in the excavated colony.

Claws rip open ant hills—and attackers

The myrmecophages with the greatest ability to dig are appropriately equipped with strong forelegs and claws capable of moving a lot of dirt. The giant anteater, which has extremely powerful forelegs, is equipped with several long, narrow, sharp claws, one much longer than the rest. Giant anteaters walk on the sides and knuckles of their hands with the claws carried back, thus protecting them from wear.

The powerful forelegs and long claws are used for defense as well. Slow-moving anteaters, when threatened, will sit back on their hind feet, balancing with their bushy tails, and strike out with their front feet. Any animal unwary enough to be caught in their grasp will be clutched to the body and torn apart. Reports exist of the disemboweling of dogs, jaguars and even people; I have seen the scars left on the arm of a man who, in a drunken state, had accepted a dare to wrestle with a giant anteater.

The claws and powerful forefeet are not just for defense, however. In my research, I frequently saw anteaters use their claws to rip open ant hills and termite mounds. Unlike giant armadillos, giant anteaters usually did not excavate a colony but rather used their powerful forelimbs and sharp claws to tear narrow deep gashes into the sides of termite mounds. Observations on captive animals showed that all but two of the claws can be held back, which allows the longest one to be used with great precision and with great force immediately adjacent to the nose of the feeding anteater. The quarter-inch-thick aluminum trays on which I served termites were frequently gashed through with one motion of this claw.

Most of the other myrmecophagous mammals find their food without digging. They seek out groups of social insects that are away from their nests, scraping away covered termite-foraging areas or turning over

Three-banded armadillo can roll itself into a perfect ball. It scrapes top off termite nests with foreclaws.

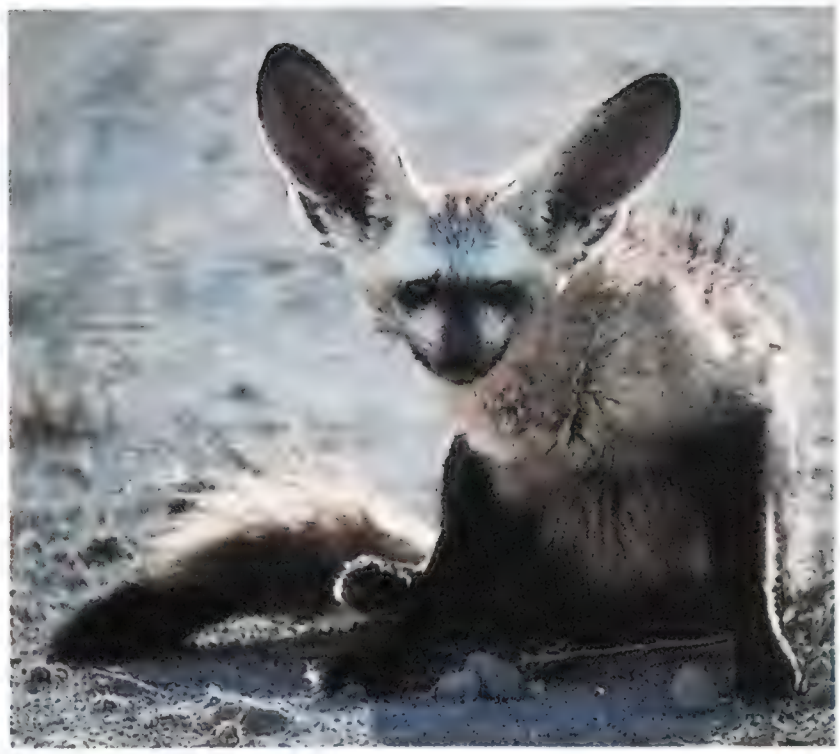
Researcher Tracy Carter holds a giant armadillo in Brazil. Note remarkable length of the claws.

termite-infested branches. Any foraging ants and termites found unprotected above ground are eaten. Some pangolins are reported to pick up termite-inhabited cow patties and turn over on their backs before commencing to feed. Holding the cow patty in its claws, the pangolin breaks it open and consumes the termites as they fall onto its belly.

Myrmecophages, like herbivores, tend to graze, feeding for only a short time in each place. Almost half of the times I saw giant anteaters feeding, they fed for less than ten seconds. Several factors seem to affect a myrmecophage's decision to leave a given feeding spot. First, there may be nothing left on which to feed, since the defense of many ant and termite species is simply to flee. Second, the available food may all have been eaten, as in the case of small foraging parties of termites. Third, and most interesting, are the occasions on which ants and termites are still abundant when the anteater stops feeding and leaves. Some researchers have suggested that this may be an adaptation on the part of the predator, a way of harvesting instead of destroying social-insect colonies; they consider it a form of what has been called "prudent predation." Others have shown, however, that the short feeding bouts that characterize many myrmecophages are probably not the result of a prudent decision made by the predator, but are forced on it by its prey. Not all ants and termites take predation lying down.

From my observations on giant anteaters and the observation of others on tamandua anteaters and aardwolves, it appears that those insects that fight back, especially termites, exhibit a coordinated defense con-

In Africa an aardwolf snuffles around termite nest. It also eats insect larvae and small animals.



The hearing of bat-eared foxes of Africa is so acute they sometimes leap into air to collect flying termites.

nected with the use of a form of chemical repellent. Worker termites are defenseless and are usually preferred by anteaters over the soldiers that protect them. So when the anteater starts feeding on workers, the few soldiers present discharge their load of chemicals, attracting other soldiers. The reinforcements swarm to the site of the attack and in turn discharge their chemicals. In a very short while the concentration of chemicals, different ones smelling to us like blue cheese, lemon-scented furniture polish or pine woods, is sufficiently high to drive the anteater away, leaving a spot covered with very upset soldiers. Termite soldiers using chemical defenses appear to be effective in limiting, if not preventing, predation by many kinds of mammals.

Ants and termites can reach staggering abundance in some areas, and so it is not surprising that even with their array of defensive strategies they are a major food source. Many mammals that do not depend on ants and termites to survive still eat them frequently. Such species can be termed "amateur myrmecophages."

Among the amateurs are the sloth bear, the bat-eared fox (above), some mongooses and some mice, which are more semipro than amateur. Termites and ants comprise about half of the total diet of sloth bears and bat-eared foxes, while half of the black-legged mongoose's diet seems to be composed of the unlikely food of driver ants—the Old World's army ants.

Most of the rest of the amateur ant and termite eaters, however, probably eat significant numbers of social insects only because they are there. These animals, including some jackals, some armadillos, some monkeys, some squirrels and some elephant shrews,

The legendary aardvark (earth pig) both hears and smells termites moving about deep underground.

The long tongue of a giant anteater is coated with sticky saliva that helps it mop up its tiny prey.

feed in a manner and in a location which causes them to encounter many ants and termites. And, not being overly fussy, they eat what is available.

At one point of their life cycle, ants and termites become irresistible to an even broader range of animals. Usually following the first rains, ant and termite colonies pour forth alates, winged males and females which mostly end up as food. These alates appear by the hundreds of thousands and flutter weakly about seeking mates and appropriate places to found new colonies. Alates are very appetizing because they have a lot of stored fat and less chitinous armor. They make particularly easy prey because they themselves are virtually defenseless and are away from whatever protection their soldier caste might have provided.

Many mammals feed on these alates, and it is quite likely that the energetically expensive business of reproduction in some mammals is tied to the appearance of these winged reproductives. Such a correlation has already been suggested for birds. Foxes and hyenas have been seen standing outside termite exit holes, snapping up alates just as they emerge on their perilous journey. Some African monkeys, who have apparently learned that alates of a certain species of termite congregate near the tops of trees, climb these trees and grab the flying reproductives out of the air.

Chimpanzees can also be found swaying in the treetops during swarms, but search out and eat many kinds of ants and termites. They fish for termites by sticking twigs or blades of grass down holes in a termite mound. The tool is then withdrawn, with up to a dozen termite soldiers biting into it. These are bitten directly off, like toasted marshmallows, or picked off with the fingers. Five chimpanzees sitting around a driver ant nest with their tools create a scene reminiscent of guests, forks in hand, around a fondue pot.

Chimpanzees are not the only myrmecophagous higher primates, for humans consume large quantities of both ants and termites. Human beings are particularly fond of alate ants and termites; especially in Africa they will go to great lengths to secure them. All sorts of devices and stratagems have been designed to collect alates; one is to water the termite mound before the first rains, thereby tricking the alates into leaving the mound prematurely. Humans have also developed the technique of "fishing" for termites. One person can collect a basketful of soldiers which, dried, can be seen for sale in some African markets. One wonders who learned how to fish from whom.

The female alates of the big South American leaf-cutting ants are also a delicacy; in some areas they may even be a seasonally significant source of nutrition. In 1853, A. R. Wallace commented on his disquietude at observing that in one Indian tribe of the Amazon, breakfast began by opening a stoppered calabash and allowing a few live ant alates collected the day before to crawl out. The alates were then consumed raw with handfuls of manioc flour.

Humans are not built to be myrmecophages, of course; we do not have long snouts or 18-inch tongues. But then neither do mice, mongooses, bat-eared foxes or sloth bears. The individual shown opposite, which happily eats ants when it finds them, could never be mistaken for an anteater. Yet where culture encourages it, ants and termites are an important source of protein in the human diet. In the end, it all comes down to a question of taste.

Henry Smeathman, in 1781, expressed surprise that the European palate would enjoy the taste of the alates of African *Macrotermes*, saying, "I have discourced with several gentlemen upon the taste of the white ants [termites]; and on comparing notes we have always agreed that they are most delicious and delicate eating. One gentleman compared them to sugared marrow, another to sugared cream, and a paste of sweet almonds." While I have never tasted sugared marrow, I can add my comment that, unlike raw workers or soldiers, fried, salted alates are probably the best cocktail snacks I have ever tried. But then I'm not a true myrmecophage.

In India and Sri Lanka, sound of a sloth bear slurping up termites can be heard 180 yards away.

By Robert Crease and Charles Mann

Backyard creators of art that says: 'I did it, I'm here'

Across the United States untrained artists, often regarded as eccentrics, have transformed society's trash into their own private visions

Litto, the Pope Valley Hubcap King, stands proudly in surroundings glittering with chrome-plated castoffs.

You can't miss Litto's place. Just drive along Pope Valley Road in the hills north of San Francisco, and there it is—the world's only hubcap ranch, Emanuele (Litto) Damonte, proprietor. There is a red house covered with hubcaps, a garage and shed decorated with hubcaps, and a few hundred yards of fence all spangled with brilliantly polished hubcaps. Hubcaps line the driveway, ring the house and festoon the outhouse; there are more than 3,000 altogether, and Litto (above) loves every single, shining one of them.

When we visited him recently, 91-year-old Litto was sitting in his lawn-chair throne in the middle of his elaborately painted driveway, swatting at his dog and watching passersby gawk at his creation. "I just did it," he told us. "I'm Litto. I'm here." A retired cement contractor, he had decided to amuse himself one day in 1957 by hanging up a few hubcaps on the wall. The next thing he knew, they were everywhere. He put an arch over the driveway and planted a sign, identifying himself as "Litto, the Pope Valley Hubcap King."

"I didn't know myself why I started," he told us in his Italian accent. "People come, they bring hubcaps, and I hang them up." He paused and looked at the rows of hubcaps sparkling in the autumn sun. "I didn't have *no idea* it was going to turn out like this."

Then, with obvious pride: "This is my place; Litto's place. It's nobody's but mine. You can travel all you want, you don't see no hubcap ranch, no hubcap king all over the world. People say, 'By golly, Litto, we never see a thing like this. We see different stuff, maybe better, but not a hubcap ranch like this.' "

A personal world made from hubcaps

We know of no other hubcap ranch, but in the past hundred years perhaps 300 Americans have listened to a call most of us ignore, and have built structures as grandiose in purpose and in scale as they are private in conception. These personal worlds are usually constructed from the debris of consumer society—scraps of wood, bottles, insulators, hubcaps and other car parts, and anything else that can be found in local junkyards.

Like all these men and women, Litto built his world himself and, like most of them, he did it at an age when our society considers people to be over the hill, their creative energies spent. He has an old man's well-earned indifference to public reaction, does not care about technique or selling his work, and does not even think of himself as an artist. He, like the others, is interested only in the radical transformation of his personal environment.

A garrulous sort, Litto was willing to talk about himself—his TV appearances, the suspicion of the nearby farmers—everything except his motives. The question of motives made him uncomfortable and he would automatically change the subject. The more we pressed him, the more the whole subject seemed to stump and even annoy him. "I was 50 years old," he said emphatically. "I came here in 1942. So I stayed here. That's it." He shrugged his shoulders. Silence.

Builders without a plan or even an explanation to themselves, Litto and the rest have put together some of the most fanciful and boldly colored objects in the American landscape. Among them are Samuel Perry

Simon Rodia spent 33 years building his Watts Towers of metal and cement without bolts or welds.

Dinsmoor's Garden of Eden, a dreamy collection of statues perched on a grove of twisted concrete trees that surround a "log cabin" made of limestone, and Simon Rodia's Watts Towers (left), a series of graceful towers almost 100 feet tall, covered with a mosaic of tiles, broken glass and shells. Such works have been called Grass Roots Art, Folk Art Environments, and Naive and Visionary. We think of these people simply as backyard builders, individuals untutored in art or architecture who worked tenaciously for years to transform their personal visions into habitable worlds in the confines of their yards.

Whatever they are called, we were fascinated when we first came across them several years ago. We wanted to learn what made them persevere in their work for decades, despite the suspicion and hostility of their neighbors. We traveled the country, learning that Litto was right on all the points that mattered: each of these places is different, and every one is as fragile as the life of its builder.

Searching out the builders frequently led to surprises. One day in Georgia we found a four-acre compound nestled in a forest of scrub pine. Within it were five odd-looking structures that we slowly recognized as a pagoda, a ziggurat, two temples and a shed. At dozens of points on the walls and on the grounds rose vaguely Polynesian figures with staring eyes and large genitalia. Atop the main entrance was the word PASAQUAN, molded in elegant cement curlicues. A hand-lettered sign had been placed near the driveway: "*Beware Of Bad Dogs*: BLOW HORN AND Stay in Car until I COME OUT!" We blew the horn loudly. There was an immediate eruption of barking and vicious snarls from the house. Half an hour passed; we could hear flies and the wind, interrupted now and then by an explosion of savage growls. Occasionally beeping the horn, we drove slowly around the compound, finding no sign of any human being.

Just as we cracked open the doors of our rented car, the dogs attacked. They were big, nasty German Shepherds, big enough to stick their heads in the windows and mean enough to take off a shoulder or two. We slammed the doors, rolled up the windows and looked out to see an old man emerging from the house.

Amazingly, he made us forget about the animals leaping and snarling at the car. He wore flowing robes the color of his mild blue eyes, and heavy bracelets on his tattooed arms. Cowry shells clattered at the brim of his straw hat, and the sun flickered from the embossed-aluminum medallions sewn on its crown (opposite). Speaking with a soft drawl, he invited us in, say-

Robert Crease is an instructor in the Philosophy Department at Columbia University; Charles Mann is a free-lance writer also living in New York.

Ritualistic figures that guard entrance to St. EOM's Georgia compound are called the "people of Mu."

St. EOM, distrustful of outsiders, uses his dogs to discourage the curious and protect compound.

ing, "The dogs won't mess with you, man, not if you don't have no evil thoughts."

Once inside, he put on a tape of himself howling to the accompaniment of a very badly tuned guitar. Relaxing in the shade, Eddie Owens Martin, or "St. EOM," as he likes to be called, told us he was born on Independence Day, 1908, in Buena Vista, Georgia. He *had run away from home at 14 and ended up in Green*wich Village, then as now a haven for artists and poseurs of all kinds. After his mother's death, he returned home in 1957 to the empty house in Buena Vista, where he set to work building the compound, *paying for the materials with income from morning* sessions of fortune-telling.

Originally he intended his compound to be a home for all races, a refuge from the "greed and depravity" of modern America. "In the world out there, you don't see art," he explained. "Here I can walk around, and wherever I look, I see something beautiful." Society has disappointed him. It is full of what he calls "curriculum people" who, sheeplike, follow the rules. He took us on a tour, fondly patting the long-haired "people of Mu" he had sculpted on the walls. "I can see that I belong here, in the place I've built," he said sadly and with regret. "There's no place like this anywhere, and people will come and deface it when I die. And then everything I've done will be forgotten."

Oblivion is not the fate of every backyard builder, *however, as we discovered on a visit to the Rock* Garden Tavern in Phillips, Wisconsin. The barkeep gave us some hot cider and leaned back to watch a blizzard finish off the afternoon. It was five degrees above zero in Phillips, 80 cold and mostly empty miles *from the shores of Lake Superior, and it felt good to* hold the warm mugs and sit in the cosy bar.

"Sure, everybody 'round here remembers Fred Smith," the bartender told us. "He built this place and used to tend bar here, till he died—poor old guy, all *crippled and hunched up like a question mark.*"

Through the side window we could see the falling snow, and beyond that the fence that encircled Fred Smith's handiwork—a Concrete Park of 200 animals and men: winged angel, mythological figures and everyday Midwesterners, all sculpted out of concrete and studded with shards of glass (pp. 88-89). Some were as tall as 17 feet—solemn Indians, horses with real skulls, statues of neighbors and friends, even the entire Anheuser-Busch draft-horse team, with wagon and beer barrels. Frozen in slow, ponderous gestures, the figures stood around the old man's plain frame house, a sparkling jumble of shapes and broken glass in the winter twilight.

Fred Smith died in a nursing home in 1976 at the age of 89, still stoutly maintaining he didn't know why he built "the best goddamned decoration on Highway 13 in the country." He reportedly began his logging career at the age of four when he followed his lumberjack father "into the woods," working until arthritis retired him in 1949 to his fiddle and the Rock Garden Tavern, which he had built next to his house. He also started making statues in his yard, mixing cement between serving customers at the bar.

Smith seldom left northern Wisconsin, or attended art school—or, for that matter, much school at all. But he felt the human urge to take possession of his surroundings by leaving a mark on them. Most of us are too timid and too sane to throw it all over to write that novel or paint those pictures or try to realize whatever nutty dream lurks in the back of our heads. Not Fred Smith. A little braver, a little more imaginative, and a little crazier than his neighbors, he molded chicken wire around wooden armatures and covered them with cement to create images of things he liked. They had big bodies and staring eyes and skinny arms and stood stiffly on their big splayed feet. Then he became enthralled with his own cleverness, covering his treasures with armored suits of pieces of broken beer bottles from the tavern; he studded their jackets with automobile tail lights and blue power-line insulators. He made the huge, uncatchable muskie, the Wisconsin state fish, with fins of lacquered tin. He made Paul Bunyan, Ben-Hur and Kit Carson. He made owls and a wild 1900 double wedding: the two happy couples ride away in a buggy, sharp glass projecting from their formal clothing and bottles of Rhinelander beer clutched in their chalk-white hands. He made all the things in his world and more. As we looked at them, we felt we were in the middle of a single enormous work, the giant creation of a man who listened to no other voice than his own.

Dinsmoor's Garden of Eden group shows professionals —doctor, preacher, lawyer, banker—crucifying labor.

Fred Smith was one of the lucky ones. When he died the Kohler Foundation, Inc., purchased the site to preserve it. The Wisconsin Arts Board and the National Endowment for the Arts jointly funded restoration of the sculptures, and it became a county park.

Less fortunate sites, such as Laura Pope's "museum," have largely been destroyed. An independent-minded woman who lived her life on a big plantation outside of Cairo, Georgia, Pope was an individual of strong convictions. She was a patriot, an early feminist, a believer in education, and a local historian. One day in 1917 she shaped a mixture of sand and cement around an iron frame—the same technique later used by Fred Smith—to fashion a five-foot-four-inch soldier lad. She set him on a concrete base on which she carved:

IN HONOR OF OUR SOLDIER BOYS
APRIL 1917 TO NOVEMBER 1918

A few months later, she put up another memorial,

Grandma Prisbrey leaves one of the houses she built in Bottle Village that is situated on 40-by-300-foot lot.

Beer-can tabs cover the dolls, and buttons are glued to found objects in Little Chapel built by Grandma.

this one to the Gold Star Mothers who lost their sons during the war. Soon the garden was full of eerie cement effigies that included suffragette idols like Ruth B. Owen, the first American woman ambassador; famous Georgians like Nancy Hart, who, during the Revolution, is said to have managed the improbable feat of hanging six British troopers; the "heroines of Grady County" and classic thinkers like Aristotle, helpfully identified as a "philosopher-king." Their white, sometimes pleading features were carefully modeled from molds made from her own face as well as those of neighbors and her two husbands.

"She never really explained why she did it," her son, Benjamin, told us. "She wanted to make the world a better place for her having been in it, I think."

Working entirely alone, she erected a brick-and-concrete wall 100 feet long and 15 feet high, commemorative busts rising from the top like menacing tropical flowers, misspelled but fervently sincere celebrations of D-Day on plaques below. A gate in the middle led to hanging gardens made from old sewing-machine parts and the porch, where she placed a totem pole of the jumbled-together faces of women.

Laura Pope was buried on February 2, 1953, two days after her 80th birthday. Benjamin helped to maintain the house and the 206 statues, most of which had a tendency to come apart after heavy rains. Like most of these builders, Pope constructed with more inspiration than knowledge, and it required almost as much labor to keep her work together as it did to make it in the first place. Benjamin sold the house in 1975. The new owners kept up the museum for a while, but it really had no place in their lives. Private art is, finally, very private.

Last year a sledgehammer was taken to the statues, and 180 sculptures were smashed over a period of several weeks. The crushed limbs and fractured faces were in weeded-over piles when we saw them, their exquisitely molded features watching the new owners do what Laura Pope had done before—create a space in which they felt comfortable by radically changing what was already there.

Old Mrs. Pope's place lasted for almost 30 years after her. Other, less fortunate, builders had their creations destroyed while they were still alive. In Woodstock, New York, Clarence Schmidt built a huge mansion out of window frames and roughcut lumber covered with aluminum foil that he called House of Mirrors, and My Mirrored Hope (p. 90). Assembled from 1948 to 1971, Schmidt's home was decorated with a jumble of plastic flowers, foil, mirrors, dolls and toys;

Laura Pope built a wall of commemorative busts, 100 feet long and 15 feet high, that still stands today.

he also wrapped acres of nearby trees and shrubs in foil, adorning the results with shrines, rubber masks, dolls, bottles and other junk. The neighbors thought the old high school dropout from Queens was crazy. Schmidt's house burned to the ground—twice. Both times he barely escaped with his life. Sleeping in doorways, he was eventually confined to a nursing home, where he died in 1978.

His neighbors should not be censured too quickly. Public expressions of individuality like House of Mirrors are hard to live with—just ask New Yorkers trying to cope with the explosion of multicolored graffiti on their subway cars. Constructing your own private world can be an inherently antisocial act, and it is hard for those in the larger community to see why they should bend over backward to accommodate people who are, after all, rejecting them. Local officials who would ordinarily treat artworks with respect, if not sympathy, are dismayed when a large, unclassifiable one is made, constructed without grants, fanfare from academia or any of the accoutrements they associate with "real" art.

A particularly dramatic example of the almost inevitable confrontation between a backyard builder and the surrounding community recently took place in Simi Valley, California, over Grandma Prisbrey's Bottle Village, 22 gaily colored structures built with bottles acquired from daily trips to the local landfill. Located in barren hills northwest of Los Angeles, Simi Valley has been undergoing development along with the rest of the state. A county Cultural Heritage Advisory Board and a historical society have been founded to advise on cultural issues. And for many of their members, the Bottle Village is not the kind of landmark they want as a symbol.

"It's an eyesore to drive past," said a member of the society. "It's not pretty, you know, when it's in *your*

Encrusted with shards of broken glass, the figures sculpted by Fred Smith stare out at a snowy landscape.

The sculptures honor the Grady County heroes of World War II, all women in uniform, and peace.

In spite of their strange and ominous appearance, they surround a spot intended for quiet meditation.

neighborhood." Her voice rising a bit with exasperation, she said, "When we have so much to be proud of here and we're growing so fast, you have no idea how *provoking* it is that the only thing people have heard of around here is *Bottle Village*."

Bottle Village itself is the creation of 87-year-old Tressa Prisbrey (p. 87), whose life has been filled with more than its share of dislocation and tragedy. Her first husband died in North Dakota in 1935. Grandma worked at various jobs and eventually found her way to Simi Valley. There she built a house of concrete blocks, then moved into a trailer. Soon she began work on the Bottle Village—a cluster of small structures made of cement and glass to accommodate her collections of pencils, seashells and dolls. Grandma outlived six of her seven children, as well as her second husband; much of Bottle Village is in their memory.

The trouble began about a decade ago, when Grandma sold the village and moved in with a surviving son in Oregon. Then Grandma moved back, and the new owner allowed her to stay. He suddenly went bankrupt, enabling Bottle Village to fall into the hands of a development company.

When we visited her, in the fall of 1981, Grandma was eating lunch in her modest trailer. She gave us a tour of the place, asking only for money to feed her cats. Sadly, it was clear that Grandma was unable to maintain her creation. The bright colors of the rows of bottles were hidden under a layer of dirt, and the buildings were deteriorating.

Grandma worried about having to leave. A senior citizens' program brought her hot meals, and the mail was full of letters from fans who had visited Bottle Village in years past. When we asked her why she had built it, her reply, unlike that of other backyard builders, was straightforward: "I did it," she said, "to house my pencil collection. I have more than 10,000 pencils, you know."

"Nearly as good as Picasso"

Feelings of local residents toward Bottle Village are divided. Although some consider it junk, many believe it is "art" and important enough to preserve. One columnist asserted that "what Grandma has done is nearly as good in its grotesque way as what Picasso did."

Working to save Bottle Village is the Preserve Bottle Village Committee—an eclectic collection of concerned individuals like James Wilson, publisher of *Glass* magazine, an Oregon publication for artists who work in that medium. It became involved when the development company pressed ahead with plans to have the village demolished. A series of confrontations ensued, which were followed by lengthy negotiations. Last November, Wilson bought the land, intending

Window frames and lumber covered with tar form Clarence Schmidt's 35-room House of Mirrors.

Around the house Schmidt set up small shrines that contained objects decorated with foil and plastic.

eventually to turn it over to the Committee. The goal is to develop it as a folk-art center.

But those who want to preserve it face many problems. Not only has the city temporarily closed Bottle Village, but also the cost of restoring it is estimated at $100,000, in addition to the original mortgage. The battle is a long one, but the city has already designated $25,000 to the Committee. As for Grandma herself, she is in a rest home in San Francisco.

The fate of this and other backyard art is more promising, as many more sites are receiving recognition locally and nationally. Five in California, New Mexico and Kansas are monuments listed on the National Register. Nine sites in California, including Litto's hubcap ranch and Grandma Prisbrey's Bottle Village, are state landmarks. California has allocated $1 million to restore and preserve Watts Towers. Groups like the Kansas Grassroots Art Association and SPACES (Saving and Preserving Arts and Cultural Environments) are conducting a national survey and looking for other sites that need preservation.

Most elderly backyard builders retreat from the social community to their own artistic world; some younger ones, like Mark Bulwinkle, retreat from the organized art world. In the middle of a quiet block of two-story working-class houses in Oakland, California, we were startled to see Bulwinkle's place (opposite), a twisted 40-foot mass of steel rising from the edge of the sidewalk. The house underneath was covered by a jungle of wild, twisted sculpture; steel sheets cut into caricatures and cartoon creatures, cheerfully cynical inscriptions burned into metal plates, and pipes bent into whirligigs, spires and flagpoles through which ran a second jungle, this one of real trees, vines and flowers. In the summer, water is channeled through pipes all over the garden, turning the entire assemblage into a fountain.

Dismaying encounter with the art world

On the porch sat its builder, Mark Bulwinkle, calmly regarding the world through a screen of snarled iron. A big man in his 30s, Bulwinkle (his real name) told us he had received an MFA in printmaking from a nearby art school. His encounters with the art world, however, had dismayed him, and he had eventually settled in Oakland. "I was sort of naive about it [the art world]," he said, shrugging. "I didn't expect the politics. I'd sort of like to show again, but it's an awful lot of bother."

He was working as a ship welder, a profession from which he derived great satisfaction. He loved cutting and putting together great masses of metal—"there's this whole welding esthetic, really." Welds are so individual, he explained, that on the job he could tell

which welder had made each weld. After work, he spent his spare time adding his own individual welds to the conglomeration engulfing his house.

"I'd like more space," he said, a little wistfully. "Think of how big this place could be if I had more space. I keep adding, but I'm limited—no backyard.

"Almost everybody asks me, 'What do the neighbors think?' Nobody, however, has ever asked me what *I* think about my neighbors' homes." He looked us over carefully, and then said, "Don't call me a folk artist, OK? That's just a way for people to call you a dumb guy. You know, 'Isn't it amazing what nice stuff this stupid jerk does?' " The term "folk art," which Bulwinkle correctly thinks is often applied to the constructions of backyard builders, is an accepted label for the honest and vigorous art that erupts spontaneously outside of the traditions of exhibits and museums. But, although they are not made to be sold in galleries, the works of folk artists still express the values of the region in which they are made, and use locally familiar designs and patterns. Bulwinkle, however—like Litto, St. EOM, Fred Smith, Laura Pope, Grandma Prisbrey and more than 300 other backyard builders—is setting himself apart from that local community, and often the society as a whole. In short, folk art says, "We are," but the works of the backyard builders cry, "I am."

Standing at the ornate iron gate of Bulwinkle's garden as we were leaving, we could see a silly little sculpture cut from a piece of tin, a jumble of jagged, rust-colored shapes with a brightly painted message that could stand as a rallying cry for all the people we had seen:

I AM NOT A FOLK ARTIST!
I AM NOT A FOLK!!
I AM A BULWINKLE!!!

Mark Bulwinkle welcomes visitors to the jungle of wild and twisted sculpture that engulfs his house.

During summer, water is channeled through pipes, turning the entire metal garden into a fountain.

SUNNY SIDE
& S
Manufactured by
HOYT BARBOUR
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The verdant charms of Irving's house, Sunnyside, seem seductive even as depicted on an 1850s cigar box.

By Kenneth S. Lynn

Washington Irving saw the American past—sunnyside up

How a bright young man avoided lawyering, to become, instead, a Hudson River squire and one of his country's beloved storytellers

The town fathers of Irvington, New York, had him in mind when they renamed their village. So did the founders of the Irving Trust Company in New York City. Of all the signs, however, of 19th-century America's enormous affection for Washington Irving, none meant more to the writer himself than the endless stream of visitors to his home at Tarrytown, New York, on the east bank of the Hudson River. Among private residences regarded as national shrines, Irving's Sunny-

Sleepy Hollow Restorations

The young Irving, painted at 26, the same year his fiancée died, appears handsome, yet touched by grief.

side was surpassed in appeal only by Mount Vernon, the pillared mansion of the Revolutionary War hero and first President for whom he had been named.

The sturdy Dutch farm dwelling that Irving purchased in 1835 needed considerable "restoring" and "improving," he said, in order to transform it into exactly what he wanted: a "little old fashioned stone mansion, all made up of gabled-ends, and as full of angles and corners as an old cocked hat." Sunnyside soon included a number of artists among its admirers. Through the sale of their lithographic impressions, Irving's architectural *jeu d'esprit* became so widely recognizable that manufacturers began reproducing its picture to advertise their products. A hundred years before famous baseball players were paid to endorse breakfast cereals, images of an eminent writer's home were invoked—without recompense to the owner—as a symbolic seal of approval for such oddly assorted items as "Sweet Owen Fine Cut Tobacco" and sheet music for the popular "Sunnyside Waltz."

Why did the home of an author not even born until five days before the end of the American Revolution arouse the same sort of reverential feeling in the breasts of the American people that was engendered by George Washington's estate? Because on the level of culture, one could argue, Washington Irving was the father of his country. He was not only the first American writer to be accepted as quality by English critics, he was also the first to give his countrymen a literary sense of their own past, both rural and urban. He charmed them into taking an interest in such distant events in American history as Wouter Van Twiller's wonderfully sleepy governorship of New-Netherlands in the early 1600s and made them see that the mythologically barren New World was actually an enchanted realm of haunted fields, brooks, bridges and houses, wherein legendary creatures like Ichabod Crane and Rip Van Winkle schemed and dreamed.

Kenneth Lynn, professor of history at Johns Hopkins, has written many books on American literature; his most recent title is The Air-Line to Seattle, *1983.*

Weathercocks and crowstepped gables

A somewhat similar explanation accounts for the renewed appreciation of the author of *The Sketch Book* and *Diedrich Knickerbocker's A History of New-York* that has taken place in the past decade. Since the early 1970s, historic preservation has become a cultural passion in the United States. One result has been a heightened admiration for Irving. In this bicentennial year of Irving's birth, conferences, exhibits and ceremonies honoring the author are being staged in his native state, at such places as the New-York Historical Society, Columbia University and the Historical Society of the Tarrytowns. More farflung celebrations are scheduled, too, for example at the University of Wisconsin and the Washington Irving Middle School in Norman, Oklahoma—the site of which Irving may perhaps have glimpsed from the back of a horse while on a tour of the West in 1832. In Spain, where the writer once served as U.S. Minister, exhibits and events are scheduled at the National Library, the University of Madrid and the University of Granada.

Meanwhile, at Sunnyside, for many years lovingly maintained by Sleepy Hollow Restorations, a Rockefeller philanthropy, the number of visitors has lately risen to 55,000 a year. The little mansion's crowstepped gables, its original weathercock, even the wisteria vine that Irving planted beside the front door, are still there to greet the visitor, establishing that nostalgic double awareness of mutability and continuity which lies at the heart of Irving's artistry.

In only one respect does Sunnyside fail to speak for its erstwhile owner. Irving lived in such contentment there, surrounded by a collection of adoring nieces, that a visitor tends to forget how extraordinarily restless the famous writer was earlier in his life.

He was the youngest child of a prosperous New York City hardware merchant, raised in the expectation that he would make a career in either business or law. Irving chose the latter, and at the age of 16 was duly

Sunnyside drowses by the Hudson, all but unchanged in 130 years. Home attracts some 55,000 visitors a year.

The Moorish Tower at right was added by Irving in 1848 after return from stint as U.S. envoy to Spain.

apprenticed to a local attorney. It took him seven years to pass the bar exam, and even then he succeeded in doing so only because "the examiners were prepossessed in my favor." For this dilettantish young man was much too interested in going to the theater, dancing at champagne suppers and smoking cigars with friends to settle down to dreary legal tomes.

At the age of 19, he began sending letters to the editor of a New York newspaper under the nom de plume of Jonathan Oldstyle, Gent. Their zigzag observations on modern manners reflected the life of the social butterfly who wrote them. The nom de plume, too, was revealing. In his desire to escape from the obligation of going to an office, Irving sometimes liked to play at the notion of how pleasant it would be if he were too old to work. That genial fantasy put down deep roots in his mind. Four years after giving up Jonathan Oldstyle, he became the old bachelor in the *Salmagundi Papers*. Throughout the period of his

Study where Irving wrote five-volume biography of George Washington includes a sleeping alcove.

best-known work, Irving adopted similar masks. *A History of New-York*, which mainly talks about the Dutch in New Amsterdam from 1624 to 1664, has purportedly been written by a whimsical old vagrant named Diedrich Knickerbocker. The stories in *The Sketch Book* are related by a nostalgic and world-weary fellow named Geoffrey Crayon.

Illness sometimes offered another form of escape to the young man. His frailness in 1804, for instance, made his worried family send him to Europe for a grand tour of museums and monuments that lasted two years. On his return, he passed the bar exam, at long last, but subsequently did his best to evade his profession by turning out the *Salmagundi Papers* in collaboration with two other satirists of the contemporary scene. (The mixed-up quality that resulted is symbolized by the title, a salmagundi being a salad of meat chopped up with eggs, onion, herring or anchovies, and drenched in olive oil and lemon juice.)

The first of the two major psychological crises in Irving's life developed in 1808. While working out his ideas for another book, he was overcome by the realization that he cared very deeply for Matilda Hoffman, the 17-year-old daughter of a prominent New York judge. If Irving hoped to marry Matilda, he would first have to demonstrate that he finally was determined, at the age of 25, to earn a decent salary, and this meant putting aside the book he was planning and addressing himself seriously to the law. Judge Hoffman increased the pressure by offering him a good position in his own law firm.

With mingled feelings of trepidation and gratitude, Irving accepted. But in February 1809, Matilda fell sick; two months later she was dead of consumption. Hounded by a grief from which he would never fully recover—half a century later, when the bachelor proprietor of Sunnyside lay dying, a picture of Matilda still stood on the table beside his bed—Irving attempted to distract himself by plunging into the composition of another book. Such was the pitch of intensity at which he produced pages that by December 1809 *A History of New-York* was in print.

Where *Salmagundi* had made fun of current foibles, Diedrich Knickerbocker's chronicle undercut New York's complacency about its past. Yet if there is a satirical similarity between the two works, there is also a difference; the humor in *A History of New-York* is much wilder. Irving's heartbroken reaction to the meaningless death of a young girl lives on in the *History*'s demonstration that life and history are irrational and not to be counted on. The book is a comic mishmash full of inflated, mock-heroic rhetoric, grotesque juxtapositions of honest and spurious research, and screwball theories (among them the con-

ceit that "North America was peopled by a strolling company of Norwegians"). In his zany portrayals of Dutch-colonial politics and commerce, in his reduction, in fine, of the rise of a great American city to an antic comedy, Irving sometimes anticipates Mark Twain and at other times the Marx brothers.

As Henry Hudson on the deck of his ship gazes for the first time on the "enchanting island" of Manhattan, the only words he can muster are "See! there!"; yet the foolish Hudson is so pleased with his eloquence that "he did puff out such clouds of dense tobacco smoke, that in one minute the vessel was out of sight of land." The first Dutch colonists to reach the New World arrive in a ship modeled after the figure of the wife of the president of the West India Company: "full in the bows, with a pair of enormous cat-heads, a copper bottom, and withal a most prodigious poop!"

Seniorest citizen, Rip Van Winkle, returns from long sleep to find not even village dogs welcome him.

Darley's engraving for *Legend of Sleepy Hollow* shows skinny Ichabod Crane fleeing the headless horseman.

At the height of the ferocious battle against the Swedes of Delaware, the leader of the Dutch forces, peg-legged Peter Stuyvesant, receives a blow on the head from a mighty adversary that causes him to reel all over the battlefield. "At length, missing his footing, by reason of his wooden leg, down he came on his seat of honor with a crash which shook the surrounding hills, and might have wrecked his frame, had he not been received into a cushion softer than velvet, which Providence or Minerva, or St. Nicholas, or some kindly cow had benevolently prepared for his reception."

As Irving acknowledged in an "Author's Apology" written 40 years later, *Diedrich Knickerbocker's A History of New-York* had sorely offended some of the descendants of the Dutch worthies he had depicted. But for the most part, he was proud to say, the book had been received in good spirit and had eventually come to be cherished. Its very name, he pointed out, had developed into a household word, and was "used to give the home stamp to everything recommended for popular acceptation, such as Knickerbocker societies; Knickerbocker insurance companies; Knickerbocker steamboats; Knickerbocker omnibuses; Knickerbocker bread; and Knickerbocker ice; and when I find New Yorkers of Dutch descent priding themselves upon being 'genuine Knickerbockers,' I please myself with the persuasion that I . . . struck the right chord." As readers sooner or later recognized, Irving's laughter at Old New York contained a strong admixture of nostalgic affection, infectiously presented.

In Darley sketch, Diedrich Knickerbocker, purported author of *A History of New-York*, has quizzical look.

The young man to whom the hustling life of a lawyer in 19th-century Manhattan had no appeal whatsoever was strongly attracted to the "*tranquillity* and *repose*"—the italics are Irving's—of 17th-century New Amsterdam. Taking off from its caricature of Governor Wouter Van Twiller as a "beer barrel on skids" whose way of presiding over his council was to "shut his eyes for full two hours at a time," the *History* waxes rhapsodic about fatness and laziness, until it becomes clear that to the author Van Twiller's world was a comic version of paradise. "Ah blissful, and never to be forgotten age! when everything was better than it has ever been since, or ever will be again," he writes. "When the shad in the Hudson were all salmon, and when the moon shone with a pure and resplendent whiteness, instead of that melancholy yellow light which is the consequence of her sickening at the abominations she every night witnesses in this degenerate city."

Yet this soporific Eden ultimately surrenders to an invading tribe of thin-shanked, thin-nosed, hard-driving New England Yankees with terrible names like Preserved Fish, Habakkuk Nutter and Determined Cock, and Irving's regret is unmistakable. *A History of New-York*, he admitted, had "opened a vein of pleasant associations and quaint characteristics peculiar to my native place, and which its inhabitants will not willingly suffer to pass away." The inhabitant he most of all had in mind was himself.

The second major crisis in the writer's life occurred not quite a decade after he had coped with the first. While he was traveling in England, the chief clerk in the English office of the Irving family's business died, and Irving was importuned by his brothers to fill in for him. The business, however, had for some years been imprudently managed, and to Irving's horror it very soon collapsed. The "detestable ordeal of bankruptcy" was "vile and sordid and humiliated me to the dust," he would bitterly recall. "I lost all appetite I scarcely slept—I went to my bed every night as to a grave." Once again a therapeutic dose of literary composition seemed advisable. Deep in "a melancholy" that corroded his spirits and rusted "all the springs of mental energy," he wrote *The Sketch Book*.

As it had a decade earlier, a dream of the past beckoned to the writer. His picture of English life derives from what he found in historical nooks and crannies. *The Sketch Book* suggests that England in the wake of Waterloo was nothing more than a picturesquely moldering ruin. The workhouses and factories that Dickens would write about so tellingly are nowhere to be seen. Irving's England isn't industrially grimy, it's dusty with age.

The most revealing examples, in *The Sketch Book*, of Irving's frame of mind, however, are not the elegiac English impressions, but the two American tales, "The Legend of Sleepy Hollow" and "Rip Van Winkle," the two stories by which he is most remembered. Each draws its imaginative vitality from the author's fear of the workaday world, his strategies for avoiding it, and his traumatic involvement in the bankruptcy of the Irving family's business.

"The Legend of Sleepy Hollow" is a variation on the drama at the end of *A History of New-York*: the

Sleepy Hollow Restorations

Peter Stuyvesant portrayed by Cruikshank, whose drawings of Dutch trousers gave name to "knickers."

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harmony of life in a drowsy Dutch-colonial valley is disturbed by the alien presence of a spindle-necked, snipe-nosed, wealth-coveting Connecticut Yankee with the harsh name of Ichabod Crane. It is interesting to consider Irving's curious obsession with New Englanders as the moral equivalent of the snake who spoiled things for Adam and Eve. One compelling explanation is that Irving was searching for a comic means of expressing his vivid fear and dislike of his father.

The elder Irving emigrated to New York, to be sure, not from New England but from Scotland. But just as Ichabod Crane is given to reading the works of that famous New England Puritan Cotton Mather, so William Irving was a sternly devoted deacon in the Presbyterian Church. A cold, austere, compulsively hard-working man, Irving built his business fortune from the ground up, but in the process appalled and alienated his youngest son. The father was long since dead by the time his firm went bankrupt; nevertheless, it is not unreasonable to suppose that the humiliation his son experienced in connection with that event was identified with the puritanical merchant by whom he had always felt humiliated. Eventually, Washington Irving turned the tables on his father by depicting Ichabod Crane's humiliation in Sleepy Hollow.

"Rip Van Winkle" is also a story of wish fulfillment. Rip's 20-year nap in the dreaming Catskill countryside carries his creator's fascination with harmonious laziness to new heights of hyperbole. And when the reawakened hero returns to his native village, he is still able to flout the work ethic by dint of the fact that he has now reached the age of retirement.

The great success of *The Sketch Book* enabled its escapist author to prolong his stay in Europe for another dozen years and to devote himself uninterruptedly to literary pursuits. Although he continued to have spells of depression, his most severe psychological crises were behind him. Thereafter, Irving's creative impulses were no longer sharpened by personal anguish, and this shows in the diminished imaginative interest of his later work.

Irving's sheer skill at storytelling made his fame all but impervious to the question of whether the stories were significant or not. For his literary polish and compelling powers of affectionate description were taken as proof that the going cliché about the barbarousness of the American character—a cliché that the people of the United States, with their collective sense of cultural inferiority, had accepted almost as unquestioningly as the people of Europe—was no longer true. Clearly, Irving was not barbarous. He was a gentleman, whose prose was infallibly smooth and whose poetic feeling for the monuments of antiquity was a sign of discriminating taste. Writers as prominent as Sir Walter Scott and Lord Byron praised his writing, as did such savage literary critics as Francis Jeffrey of the *Edinburgh Review* and William Gifford of the *Quarterly*, who normally were far from kind to Americans. Twenty years after Sydney Smith's famous rhetorical sneer, "In the four quarters of the globe, who reads an American book?" Irving's popularity could provide a satisfying rebuttal. In Europe, said Thackeray, Irving was regarded as "the first Ambassador whom the New World of Letters sent to the Old." Such testimony was not lost on the insecure denizens of Irving's native land, and they responded by making him a culture hero.

Old World charm, New World subjects

Yet by his decision to remain in Europe for as many years as he did, Irving endorsed another notion about America's cultural deficiencies—that the soil of the New World was too thin to sustain the imaginative needs of its writers. In *A History of New-York* and the two American tales in *The Sketch Book* Irving had seemed desirous of scotching this notion. But when he chose to continue his love affair with English rural life in *Bracebridge Hall* (1822) and then to record his responses to an extended stay in Germany in *Tales of a Traveller* (1824), rather than to return to the United States, he lent new credibility to the idea that the American writer was better off living in Europe and dealing with European themes. In the wake of Irving's expatriate example, the difficulties of writing about America would be exasperatedly recited by his fellow New Yorker, James Fenimore Cooper. At mid-century they would again be referred to, this time by Hawthorne. And in the 1870s they would finally prompt Henry James to settle permanently on foreign shores.

In 1826 Irving arrived in Spain, expecting that his visit would be brief. Instead he stayed for nearly four

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years, working in libraries and historical archives. *The Life and Voyages of Christopher Columbus* (1828) and *A Chronicle of the Conquest of Granada* (1829) were the principal results.

With an honorary degree from Oxford proudly in hand, Irving returned to the United States in the early 1830s and settled into the agreeable life of a country squire. Words continued to flow from his pen as effortlessly as the brook on his new estate tumbled into the Hudson, and many of the subjects he now took up were American. A trip to the trans-Mississippi West was duly chronicled in *The Crayon Miscellany* (1835). *Astoria* (1836) recounted the history of his friend John Jacob Astor's ill-fated fur-trading enterprise on the Columbia River. *The Rocky Mountains* (1837) traced Benjamin Bonneville's adventures as an explorer and trapper. Irving devoted his last years to a five-volume *Life of George Washington* (1855-1859).

Irving was conservative in politics. In *A History of New-York* he had had fun at the expense of Jeffersonian Democrats by including, in the disguise of William Kieft, a Dutch-colonial governor, a bitingly satirical portrait of the Democratic Party's titular leader. Yet Irving's standing with Americans in general was so high that he was courted by liberal supporters of Andrew Jackson as well as by anti-Jacksonian Whigs. During Jackson's first term he accepted an invitation to return to London as secretary to the American legation. After the Whigs captured the White House in 1840, President Tyler appointed him minister to Spain, and Irving served in Madrid until the Democrats took back the presidency in 1844.

Just as his career ultimately transcended the field of literature, so did his most accomplished stories. By the time of Irving's death, his accounts of Knickerbocker New York, of Ichabod Crane's flight from Sleepy Hollow, of Rip Van Winkle's 40 winks, had become incorporated into American folklore. This condition persists. Knickerbockers, the knee pants named after the trousers that Thomas Cruikshank put on colonial Dutchmen in his illustrations for the Knickerbocker *History*, went out of style in the 1930s. But Sleepy Hollow restaurants and Rip Van Winkle motor lodges still dot the landscape, attesting to the fact that Irving's countrymen are familiar with his work—whether they have read it or not.

Posthumous tribute, painted by Schussele in 1863, shows Irving (seated, dark suit), surrounded by America's great men of letters. Among them: Emerson and historian W. H. Prescott (seated to Irving's left and right), Longfellow (leaning on Prescott's chair), and Hawthorne (standing behind Longfellow). James Fenimore Cooper is seated next to Emerson. Many of these writers visited Sunnyside, but never all at once.

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RENAULT

THE ONE TO WATCH

Astride an experimental ice pond at Princeton, Ted Taylor anticipates a new "glacial era."

By Richard Woodley

A physicist who would like to put the world on ice

Ted Taylor, once known for designing atomic bombs, sees ice ponds as a source of cheap, safe and efficient energy

The sign on the little pump house proclaimed: "World's First Ice Pond."

"My God!" Ted Taylor gasped in dismay as he stepped from the car in the back lot of the Kutter's Cheese factory near Buffalo, New York. It was a beautiful early-April day, strong sun, warm breeze. For him, dreary weather: it had stolen most of his ice. What a fortnight before had been a 20-foot-tall, man-made Matterhorn was now a molten lump sinking into an expanding pool of cold water. Meant to last the summer, the ice would barely survive the spring. "We missed it by two damn weeks because we didn't have the cover," Taylor said as he slogged dejectedly through the mud bordering the pond. "Well, at least we've proved the theory works."

Anybody can make ice. All you need is cold air and water. Enough chill in a winter, a snow-making machine or even a sizable water hose, and anybody can make several hundred tons of ice. Cover such a big pile with insulation, it will last the summer. As it slowly

Kirkpatrick and Taylor (seated), with snow-making machine, enjoy early success at Princeton in front of mountain-shaped ice pile, under tent.

melts, all you need is a simple system of pipes and pumps; the ice water can be used to air-condition a building. Cheap, clean, safe energy.

Ted Taylor has been making big piles of ice for four winters, experimenting. His theory is that you can make a business out of it, make it pay. This was the year to prove the theory. Making ice was easy, a matter of natural laws. Making it pay was proving dicier, a matter of men, materials and manufacture.

Taylor is a theoretical physicist who has turned to applied physics and engineering. He is at his best when his mind roams free. His visions are based on natural laws, not engineering precedents or practicality. He dreams up better ways to make things work. He is not at his best making things work for himself. He is distracted by his thoughts. Waiting for water in a kettle to boil, he can tell you how to improve the efficiency of an ordinary kitchen refrigerator by 90 percent. Meanwhile, he has not turned on the burner under the teapot. Finally, he has to make instant coffee from the hot-water tap.

Ted Taylor, 58, is tall and sturdy, with wavy gray hair and bushy eyebrows and strong hands. He and his wife, Caro, whom he married the week after she graduated from college, live in modest comfort in Damascus, Maryland, where she is a librarian. They have five children and are grandparents.

Taylor has always been fascinated by the shapes and forces and energy of things. Academics bored him. At Exeter, he got a "D" in physics. But he wanted to be a physicist. He joined the Navy when he was 17, attended the California Institute of Technology while in the Navy V-12 program and graduated when he was 19. In 1946, he enrolled in the graduate school at the University of California, Berkeley, to study experimental physics, but he was more interested in theory. He preferred dreaming things up. "A lot of physics was a mystery to me," he said some years ago, "and still is." Twice he failed oral exams for his doctorate. His academic career seemed finished.

But one of his professors, who had worked on the first atomic bombs in the Manhattan Project at Los Alamos, got him a job there. While still in his 20s, he made his mark with new ideas for bomb design, leading to the smallest, largest and most efficient atomic bombs then built. Taylor is now sorry he had anything to do with atomic bombs. Or with nuclear power in any form. "As far as I'm concerned," he says, "the world is a less safe place because of the work I did." In recent years he has lectured widely and testified before Congress against nuclear power and for nuclear disarmament. He served on the President's Commission on the Accident at Three Mile Island. Since then, he has turned his full attention to design of renewable-energy systems derived from the power and rhythms of the sun. You can't wage war or terrorize a populace or contaminate the environment with a pile of ice.

Everything has heat in it. "Heat," as Taylor puts it, "is nothing but motion of molecules and atoms." You cool things by extracting heat. It was by thinking of heat that his life's work turned to ice.

In 1975, Taylor was pondering the question of how to diminish pollution from use of pesticides and fertilizers in agriculture. He came up with the notion of massive greenhouses covering millions of acres of farmland, in which you could grow protected wheat and corn and rice. You would have to heat these mammoth structures in winter and cool them in summer. Costs for using energy derived from fossil fuels would be ruinous. For heat, Taylor thought of using solar power, one way being to create giant hot-water ponds. "Giving attention to heating," he recalls, "we were always trying to avoid cold air. One afternoon, I said, 'Gee, is there a way of capturing the heat-absorption capacity of that cold air in winter and saving it until summer to solve our cooling problem?' As soon as I asked that question, the answer was obviously 'Yes.' You freeze water to make

Richard Woodley, a New York-based free-lance writer, is currently working on a book about marathon running.

Inaugurating Franklin Heirloom Dolls' new series portraying the great reigning queens of England

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Advance ordering deadline: August 31, 1983.

Doll shown smaller than full size of approximately 19" in height.

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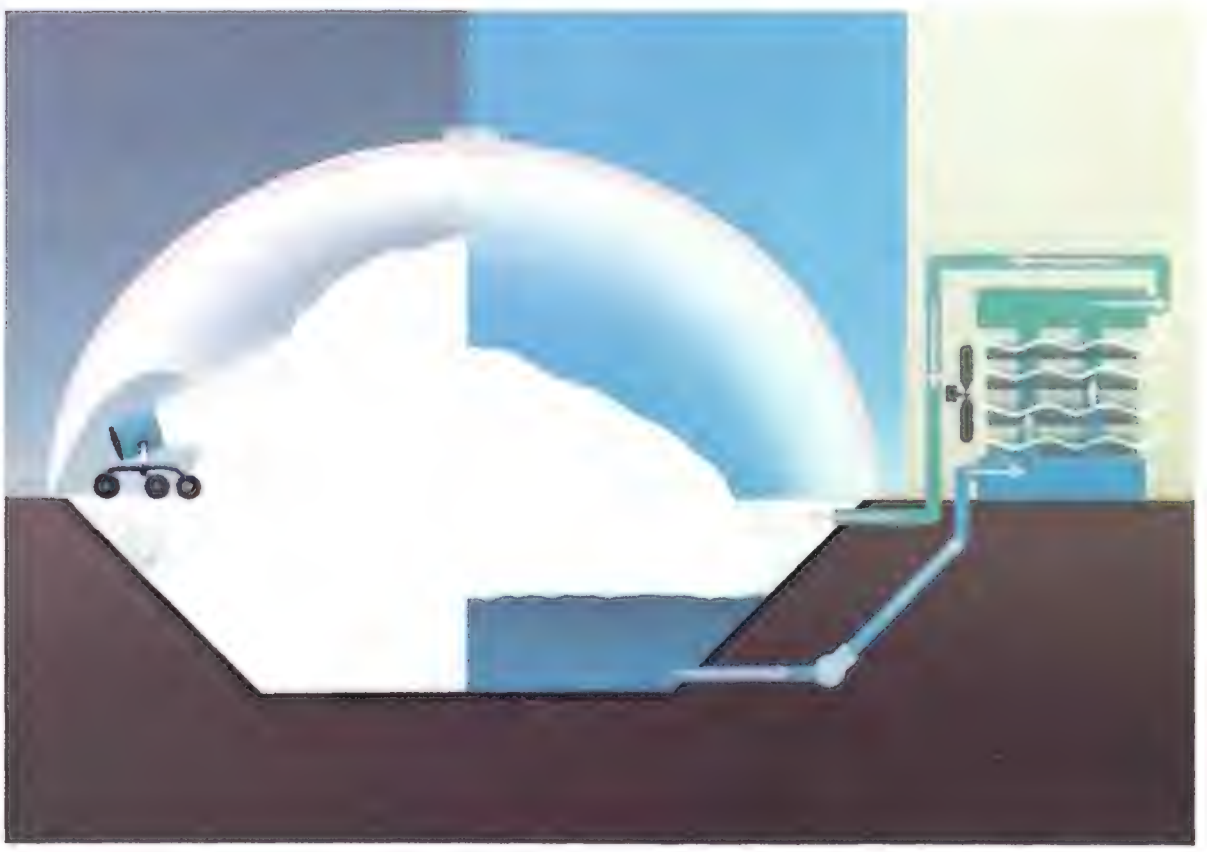
ice, and store the ice in icehouses."

You could harvest ice as it was done a hundred years ago, by chopping up the frozen surface of a lake. You could build up frozen surfaces by spraying on more and more water, like a skating rink. But temperatures in most places would produce insufficient thicknesses of solid glare ice. There was a more modern technology. On ski slopes, snow-making machines were seasonally building up tons of man-made snow. Taylor didn't want dry, fluffy snow because it takes too much volume. But if the flow of water fired through the machines at subfreezing temperatures were adjusted to make slush, excess water would quickly drain off and leave a much more compacted pile of ice.

Nothing came of the greenhouses. In 1976, Taylor came to Princeton University to teach, and his ideas for hot-water ponds and ice ponds (as he calls his piles of ice) were expanded by students in his course on solar energy. Princeton's Center for Energy and Environmental Studies and its director, Robert Socolow, took an interest. Then, in 1979, the Prudential Insurance Company planned to build two three-story office buildings in Princeton, drawing upon the most advanced energy-saving design techniques. The building would be designed efficiently for heat, drawing directly upon solar energy. But the architects were attracted to the ice-pond idea for cooling one of the buildings. The company provided the Center a development grant of $150,000. Socolow brought in Taylor.

The first experimental ice pond at Princeton in 1980 was simplicity itself. It was made in a hole 75 feet square at the top and 15 feet deep. Collaborating with Taylor was Don Kirkpatrick (p. 106), a mechanical engineer and solar engineering consultant who in private industry had worked on the mechanics of satellites. He seemed a good counterbalance to Taylor, to make sure that what Taylor dreamed up to do also got done.

They first tested making both solid glare ice and snow-machine slush, and decided on the machine. The pond was excavated near an old storage building, which they would try to cool with the ice melt. Pipes were laid



Ice pile made in winter, left, melts in summer, right, producing cold water at bottom for circulation through building and return to melt more ice.

and connected to make heat exchangers—like radiators—in the building. With the snow-making machine planted on the ground like a machine gun, they made a low pile of a thousand tons of ice. They lost half of it to sun and warm breezes before they covered it with layers of straw and polyethylene sheets, weighted down by old tires. That summer, pumps sent water at 32 degrees F from the bottom of the ice pile into the building, where it absorbed heat, and returned it at 45 degrees to be dumped back on the pile. The usually sweltering building was cool. The hottest days would drain away seven tons of ice. Taylor resigned from the university faculty to concentrate on ice.

To build the final Prudential pond in an area that had strict esthetic architectural codes, they would need to make the pond, if not beautiful, at least acceptably less unattractive. Over a huge hole they would need a huge dome. As a step toward that, the next winter they constructed over a test hole a small white polyvinylchloride tent, suspended over steel. For making snow, which requires the unobstructed passage of cold air to freeze the water droplets falling onto the surface of the pile, they could roll up the sides of the tent. To preserve the ice, they sealed the sides back down and covered the ice with blankets of polyethylene foam. By winter's end, they had made another pile of ice, their first small mountainlike shape, under the tent. They were ready to start at Prudential.

Taylor was becoming ever more intrigued by the complexities of crystallization, compaction, the formation and behavior of ice. Using an ordinary garden hose propped up on a stepladder in the back yard of his home, he was making his own little piles of ice.

There are mysteries in even so common a procedure as making ice. Water droplets suspended in below-freezing air—say 28 degrees F—do not necessarily freeze. The water in the

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Under construction: dome for Prudential ice pond, mounted on aluminum arches. Pipes will run from pond to cool office building in background, far right.

spray may be supercooled but remain liquid until part of it freezes later. Some particle in the air is introduced into the spray (nucleation) to begin the process of crystallization. At first, Taylor says, "I had no appreciation of the role of nucleation and how to enhance it. The process is actually very poorly understood."

You could encourage crystallization by introducing silver iodide crystals (which, though they are used in cloud seeding, Taylor won't use because they are expensive), or even dust. He believes the best "seeds" to be other ice crystals.

This year he built up a little pile eight feet tall. He spent hours marveling at the wonderful pinnacles and icicles that were formed. One morning after a night of spraying he found delicate triangular cups of ice crystals strewn about—"ice flowers," he called them—the largest measuring six inches across (opposite). It never happened again. Nobody has been able to explain them. For two months he kept the ice flowers in his freezer.

He experimented with different nozzles, different sprays. "Now," he asserts, "I can pretty much look at a spray and tell if it can make ice, or what type of ice it can make."

The main lesson from the garden spray was that in climates cold enough to freeze the larger droplets, you could use a hose to build a big pile of ice. That opened up vast new possibilities. Modest ice ponds could be cost-efficient for small businesses such as those in the northern dairy industry, with its extensive cooling needs for the processing and storing of milk and cheese.

With Kirkpatrick, Taylor formed "TKI-Ice Energy Systems," a company to design and construct ice ponds for profit, and submitted a proposal to the New York State Energy Research and Development Authority (ER&DA) to survey the needs of industries throughout the state, for possible application of ice ponds. The key to everything was, of course, economics. "We will give you ice at a value which is competitive with cooling made by electric power—say six cents per kilowatt hour," Taylor reckons. "That's the break-even point." He estimates that the energy-efficient Prudential building will save $15,000 a year by ice-pond cooling.

Construction of the Prudential ice pond began in the summer of 1981 and was scheduled for testing with ice this past winter. The pond was a half-acre excavation 20 feet deep, with sloping sides and bottom lined with a thick polyvinyl-chloride sheet. The dome (above), spreading over an area the size of half a football field, and the most costly part of the construc-

tion, was a single span of aluminum arches covered with a light polyester-vinyl fabric. Held underneath the fabric by a net were fluffy pink rectangles of fiber-glass insulation. Then another plastic sheet was sewn under that, making an insulation sandwich.

The entire dome was supported at the corners by four steel tripods on which were electric motors that could raise the dome 20 feet for the making of ice and lower it for preservation. Three huge blue snow machines—each costing $14,000, the size and shape of searchlights—with small high-power nozzles around the perimeter of a giant fan, would spew out 100 gallons of water a minute, mixing it with compressed air to produce more than 20 tons of ice per hour.

In this three-story-tall structure, a 40-foot mountain of ice would arise, 8,000 tons of it.

While the work was going on, Taylor roamed north to the dairy country. Kutter's Cheese had expressed an interest. As cheese factories go, it has a modest output—three million pounds annually. Cooling needs are large, both to chill heated cream in production and for storage of cheese. Winters around Buffalo are cold and long. It was a perfect place to make ice using just a hose and simple insulated cover.

The Kutter brothers, Tony and Dick, who run the plant, knew of Taylor's test ponds. "If Ted hadn't tried it before," Dick Kutter said, "I would have thought this was the worst hairbrained scheme I ever heard of—to save winter ice for summer. I would have backed right off."

With ER&DA contributing half the initial costs, estimated to be about $30,000, the Kutters decided to put an ice pond in their back lot (p. 112). The excavation would be about 50 square feet and six feet deep. In it, using a hose with a 26-gallon-per-minute spray and power from a three-horsepower pump, they hoped to pile 650 tons of ice. The ultimate savings in cooling costs would be about $3,000 a year, Taylor estimated.

With both projects lined up, Taylor was buoyed and expansive. He envisioned ice ponds all over the place, large ones, small ones.

You cannot, however, make a pile of ice whenever you feel like it. You need frigid weather. Construction on both projects lagged into the precious winter. In Princeton, time was lost because of the tricky construction of the dome, the likes of which had not been made before. It had to be anchored firmly enough so that a strong wind wouldn't take advantage of its aerodynamic qualities and lift it off and deposit it in the adjacent parking lot. Communications and chain of command in the bureaucracy among TKI, Prudential, architects and contractors were not always clear or swift. At Kutter's, excavation and pipe laying got started late. December mud bogged down the laborers. The pump house sank in it.

But work proceeded anyway, Taylor explained, "because we would have lost another year of commercial demonstration if we didn't start up."

At Kutter's, they finally began making ice in January. They guyed an ordinary extension ladder out from a telephone pole, lashed the hose to the ladder and affixed two $19 nozzles with pigtail helices on their ends to help create the spray. The ice pile built quickly.

At the Prudential building, the three big machines also started making ice in January. But a week later the weather turned too warm. Ice was

Taylor's unexplained "ice flowers" were gathered after night of spraying.

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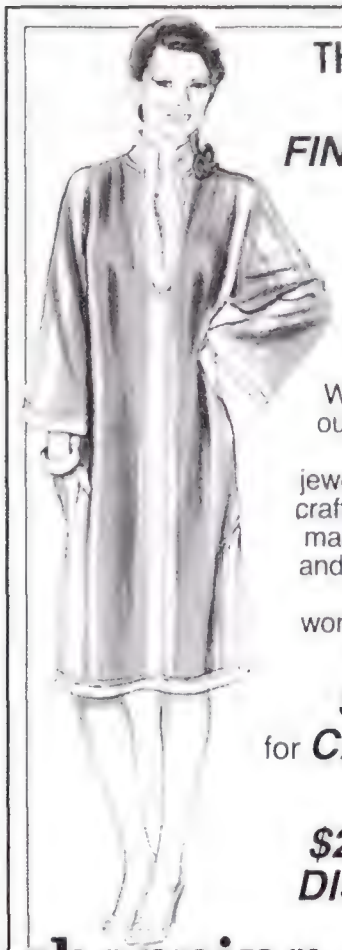

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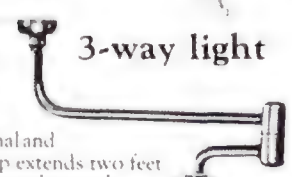

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A New York energy official visits the winter ice pile at Kutter's Cheese.

made in fits and starts after that. Under time pressures, they had started using the dome before it was entirely finished. Water got in between the plastic layers, soaked the insulating pads, and caused part of the inside layer to rip away and fall down on the ice. Ice production ended.

What greeted Taylor on a visit to Princeton in early April was not 8,000 tons of ice, but 2,500 tons—under a dome that could not be raised.

Although the experience gave Kirkpatrick serious misgivings about TKI's role as a general contractor, Taylor was pleased with their first truly huge pile of ice, even though it wasn't all they wanted. The berg of 2,500 tons would allow Prudential to test the system. And probably it would last all summer anyway.

Later, he climbed up the ice pile, under the drooping innards of the dome, and pronounced: "A glacial era has come to Princeton." He added, chuckling, "That being defined as a period when snow from one season does not disappear before the snow of the next."

Meanwhile, ice making up at Kutter's had proceeded spectacularly, even in the shortened season, and there was a minor mountain of it. It was ready for the insulating cover. A local troop of Boy Scouts had stuffed 200 plastic bags with wadded newspaper to lay on the ice. A custom-made inflatable pad and sturdy plastic sheet to cover it had been ordered from a company in Ohio.

Before making his climactic journey to Buffalo to supervise completion of the Kutter's job, Taylor paused for a reassessment. "I've just figured out the application," he said, leaning against the kitchen door waiting for water to boil over an unlit burner. "I've scaled it way down. Ice ponds are perfect for dairy farms, to cool milk. With a $5,000 investment, using a hose that pumps four to five gallons a minute—like in my back yard—a dairy farm with 300 cows could save $5,000 a year on cooling costs. There are little niches it will fit into. An ice pond would be ideal for a brewery."

But he was not yet finished thinking big. The computer industry, he noted, was already using large, water-cooled systems. What an opportunity for ice ponds! And bigger. All of Long Island was dependent on aquifers for fresh-water supplies. The supplies were becoming contaminated. If you make a big ice pile from sea water, the salt and other impurities in unfrozen brine, through gravity, will naturally drain down and out. You're left with fresh water. He mentioned one Long Island town that had already expressed interest in this purification-desalinization process. "The pile of ice could be 70 feet high," Taylor sang, "and four acres big. You wouldn't even need a cover." He hoped to get a New York State grant

Kutter's ice pond, as Taylor sees it in the spring, is almost melted away.

Spray from a hose lashed to overhanging ladder was source of ice at Kutter's.

to experiment on that next winter.

While Taylor was speculating at Princeton, the sun was out. It was warm enough for a shirt-sleeve picnic. It was as warm in Buffalo, where the scene that met Taylor was of three-quarters of his ice pile gone (opposite).

"We had 400 tons of ice," Tony Kutter said, as Taylor stomped around the pond to assay the damage. "Ted didn't think it would melt that fast. But we've proved it will work. We used 32-degree water from here all winter long in processing. We'll definitely do it again next year. You'll see these all over the country."

The dual setbacks at the two facilities did take a toll. Taylor and Kirkpatrick, citing some rather gentle disagreements in point of view and practicality, decided to head off in somewhat different directions, amicably dissolving their partnership in TKI. Kirkpatrick would remain as manager of the Princeton pond and consultant to Prudential, and would pursue such industrial applications for ice ponds. Taylor, detached from the Prudential pond, would form a new company. Along with facilities like that at Kutter's Cheese, he would persist in the hunt for new uses of ice that intrigued him.

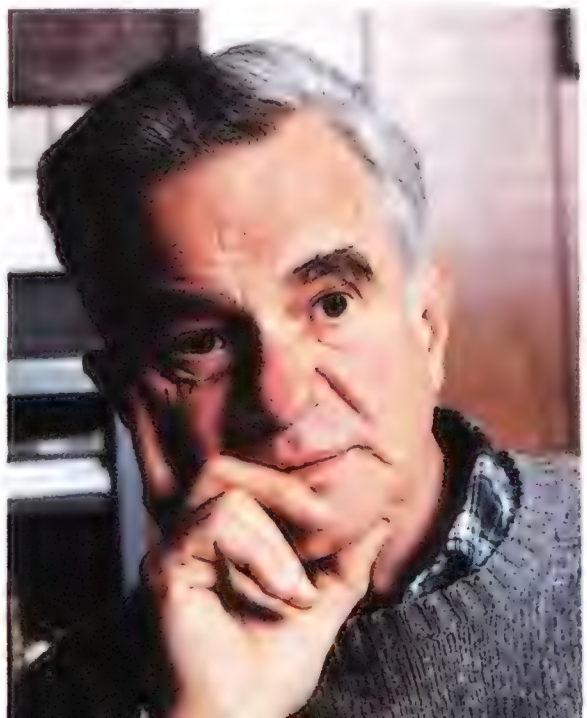
He has a dream beyond the current type of ice pile. "What would we really like to have? We'd like to have a big, flat pond full of solid glare ice all the way to the bottom. In places with very cold winters, you could see how economical this would be. But we don't know how to do it. The people who figure out how to do it will get rich. In a place like Minneapolis, where the temperature is often below zero, we'd like to supercool water and pour it into a big hole in the ground, keep it supercooled and not frozen—meaning you don't produce that slightly magic set of phenomena, like that speck of dust or something, that forms the pattern on which the molecules can arrange themselves to form the magic word—or put in the magic thing—and WHOOF! It freezes solid, and you're all set.

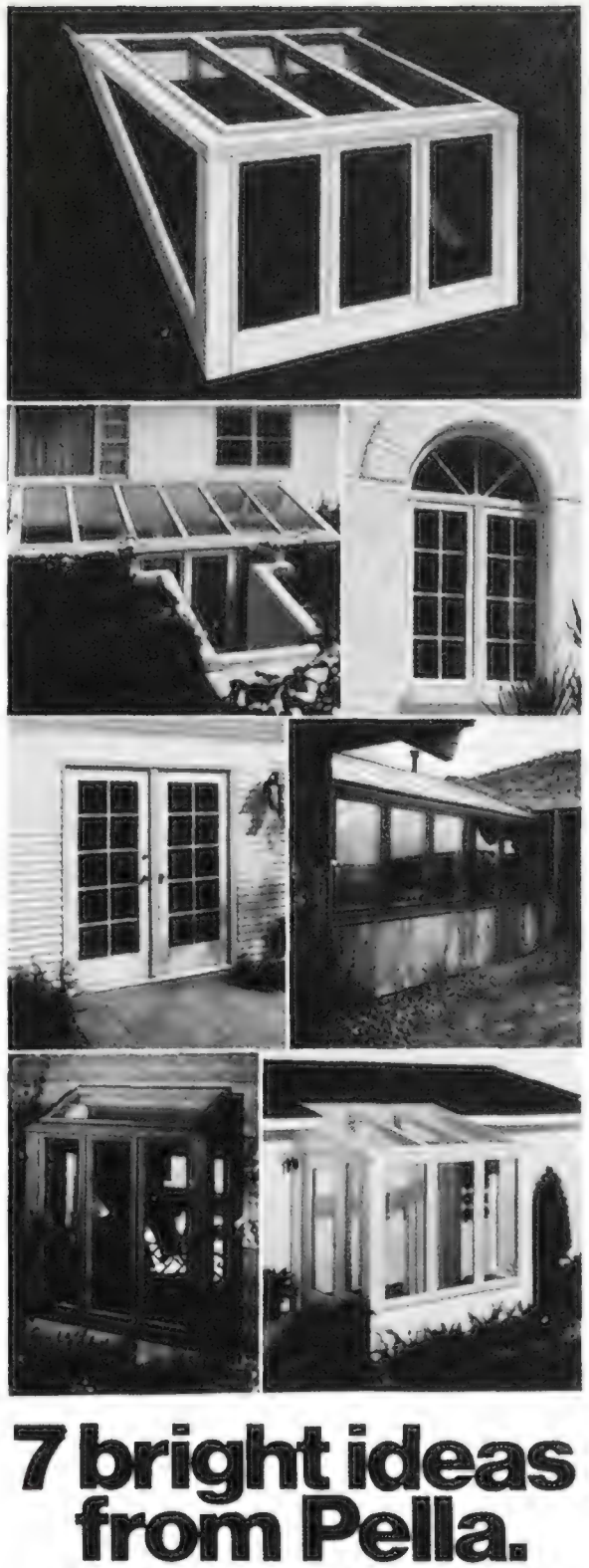
"A hundred years from now people will know how to do this. I'll bet very heavily that people will be using ice ponds in which the ice is made in ways that we haven't even *conceived*. They will answer questions regarding the basic process of crystallization of ice that we haven't even had the sense to formulate."

A hundred years does not fall within the convenient scope of the operative optimist. For Taylor, blue sky is not an ethereal daydream but a real place where the water molecules await, and the motes of dust, and the rhythms of temperature; the climatic place where the action is.

"It is very likely," he said, reflecting resiliently, soon after the disappointments of the season, "that another half-dozen ice ponds will be built this year."

At home, Ted Taylor thinks about next year, dreams about the next century.





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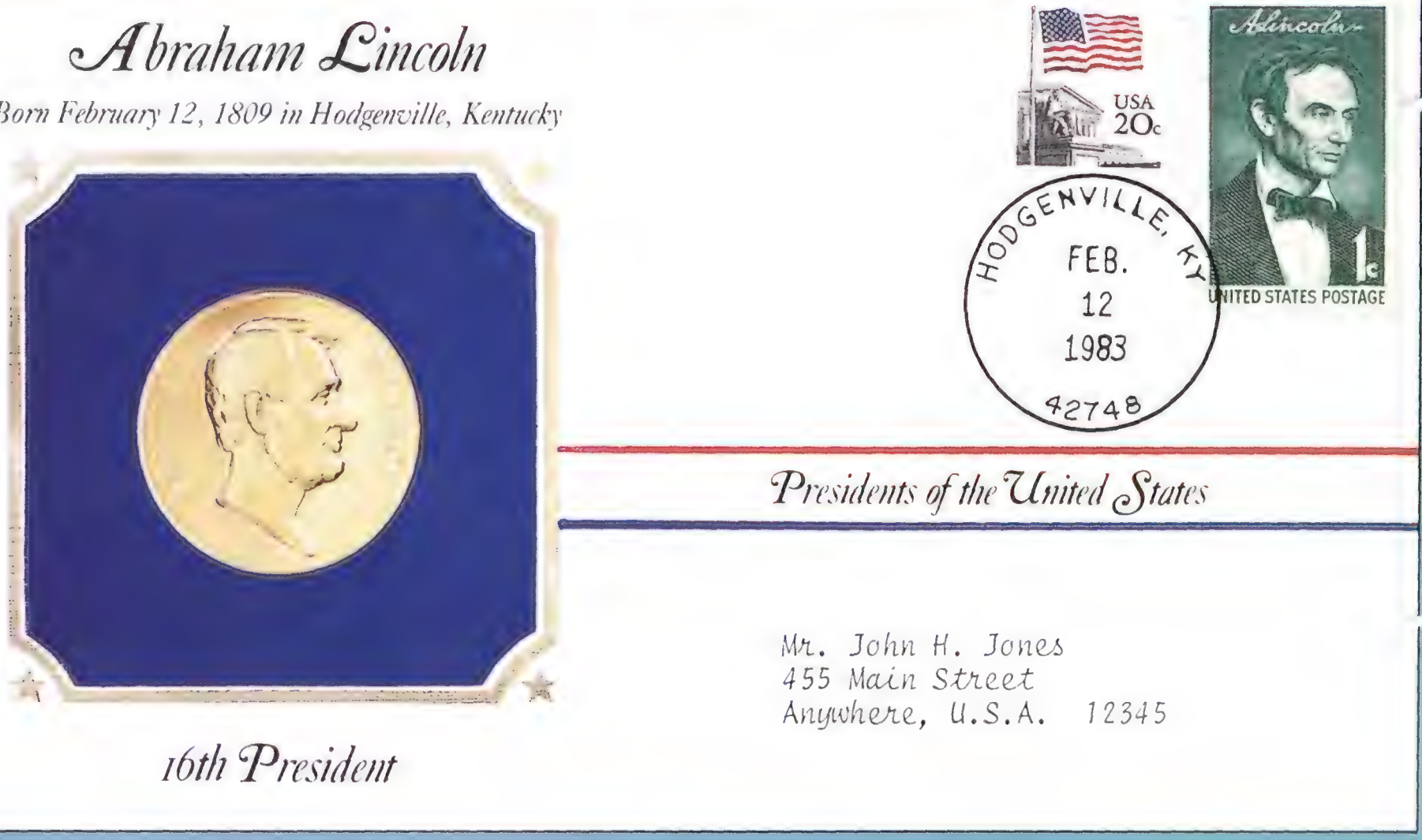

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26th President
NEW YORK, NY
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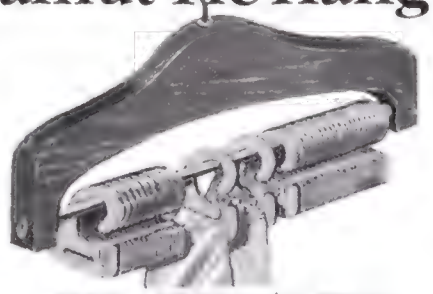

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Book reviews

Sylvia Beach and the Lost Generation
Noel Riley Fitch
W. W. Norton, $25

In the evolution of legends, some are self-created, others bloom and fade faster than French lilacs in spring, and there are still others whose reputations spread as rapidly as fields of phlox or buttercups.

Sylvia Beach, a dedicated American bookseller in Paris, is unarguably in the last category. Her shop, Shakespeare and Company, started in Paris at the onset of the 1920s, became a central gathering place during what Archibald MacLeish once called the "greatest period of literary and artistic innovation since the Renaissance."

In this historical-literary account of the life of Sylvia Beach, Noel Riley Fitch has produced a work of considerable scholarship that draws us back once again into the superb cultural period between the two world wars.

The principal threads are Beach's relationships with the French bookseller Adrienne Monnier and with James Joyce, and the development of her own Left Bank store on the rue de l'Odéon through good and bad times. It is a remarkable story, and told here with convincing documentation and style.

Even confirmed Joyceans will gain insights into the circumstances surrounding the publication of the first edition of *Ulysses*, its subsequent printings and the smuggling of copies around the world in the face of censorship. All of Joyce's ec-

centricities come to the fore, intermingled with an astonishing cast of characters who peopled Beach's bookstore and lending library. Many of the principal writers of the 20th century made their exits and entrances at the rue de l'Odéon. Even central casting would have difficulty producing their likes again.

Consider, for example, a young reporter for the *Toronto Star*, Ernest Hemingway, awed by the assembled talent, promoting advance orders for *Ulysses* and beginning a 40-year friendship with Beach. He would later, in a famous remark, sum up what many luminaries felt about the period: "If you are lucky enough to have lived in Paris as a young man, then wherever you go for the rest of your life, it stays with you, for Paris is a moveable feast."

He might easily, as Fitch demonstrates, have said the same on behalf of young women, for besides Beach and Monnier, many women found Paris a compatible setting for their work. Gertrude Stein (who resented Joyce's stature in Paris) has been well documented, but Elizabeth Bishop, Bryher (Winifred Ellerman), Janet Flanner, Kay Boyle, H. D. (Hilda Doolittle), Nancy Cunard, Djuna Barnes and many other women were deeply involved in activities at Shakespeare and Company.

This volume will become the definitive word on the Beach influence. While additional memoirs of the Twenties and Thirties are inevitable, it is hard to imagine anyone improving on the record with a specific focus on Shakespeare and Company. Professor Fitch (Point Loma College, California, formerly Pasadena College) has been engaged in Beach studies since the 1960s; she has tapped essential sources, conducted important interviews and produced a believable narrative encompassing personalities such as Ezra Pound, André Gide, T. S. Eliot and Paul Valéry, and the many artists and composers who frequented the bookstore.

Fitch realizes that the term "lost" for the generation of the Twenties and Thirties is misused. If ever a generation of American, French, Irish and English writers, among others, was in the process of finding itself, it was during this splen-

At Shakespeare and Company, Sylvia Beach and James Joyce look over the early reviews of *Ulysses* in 1922.

Heroic Bronzes of Riace

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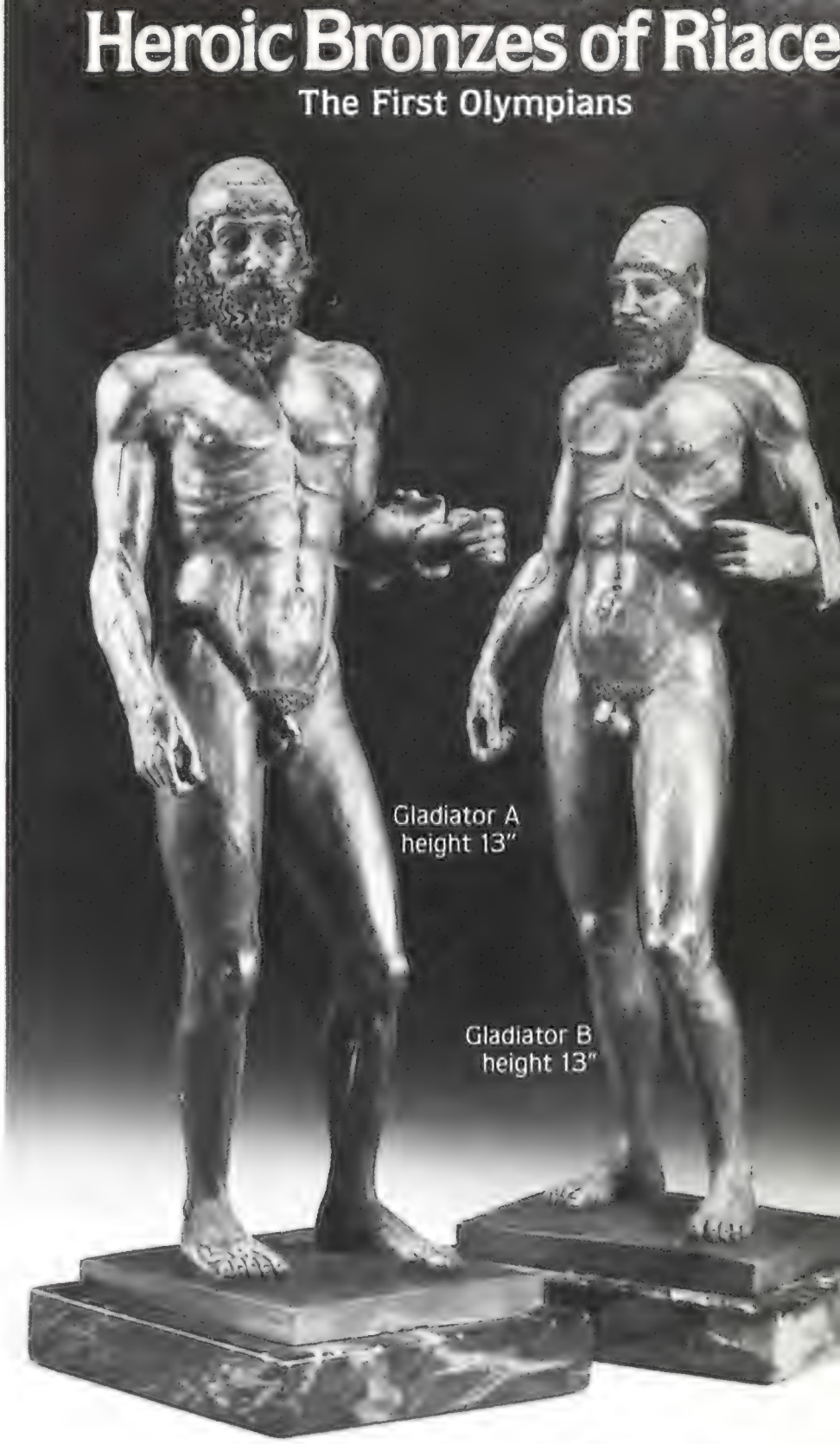

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did era. Physical location, while important, was secondary to craft. The seeds planted, the books written and the music composed are still growing in the consciousness of writers and artists to this day. Sylvia Beach was not only present at the creation, but played a nurturing role in the flowering.

By being herself, and doing exactly what she wanted to do, in the right place at the right time, Sylvia Beach helped a generation find itself. The world of literature and culture will remain forever in her debt.

William Claire
Poet, essayist, editor of *Voyages* (1967-73)

Hen's Teeth and Horse's Toes: Further Reflections in Natural History
Stephen Jay Gould
W. W. Norton, $15.50

Scientists who are as good at writing English as Stephen Jay Gould are as rare as hen's teeth. As a paleontologist, and evolutionary historian nonpareil, he is largely responsible for reviving influential theories on the slowdown of maturation in advanced species and the unpredictable shifts in the evolution of all life. Complex as these theories are, Gould can present them with lucid charm.

Whether writing on evolution in *Natural History* magazine, or baseball in *Vanity Fair*, Gould has shown himself to be a master of the essay form. *Hen's Teeth and Horse's Toes* presents 30 of his most recent contemplations on "one of the best documented, most compelling and exciting concepts in all of science," by which he could mean only evolution itself.

As always, Professor Gould—a veteran of 15 years on the Harvard faculty—has important lessons to teach. But he is no ivory-tower pedagogue. "Ideas can be agents as surely as guns and bombs," he writes here, before firing off mental missiles against such targets as "cowardly and conservative" publishers of public school textbooks, the persistent "nonsense" (as he calls it) of scientific creationism, and anti-Semitism in American immigration policies of the recent past. He indicts the revered Teilhard de Chardin for likely involvement in the Piltdown scandal, and decries the narrow interpretation of genes as the sole units of evolutionary change.

What emerges, however, from this entertaining book is not a volley of invective, but instead a scientific paean to the glory

of random and reasonable changes wrought by evolution.

He illustrates his essays with fascinating and bizarre examples from the animal world. Hen's teeth do exist; scientists have released genetic information long dormant in chickens to grow dental tissue in, of all places, the eyes of mice. Like the extra toes that occasionally pop up naturally among horses, these are atavisms. More than conversation pieces, to Gould they are a means by which we can distinguish current utility from historical origin. Blue-footed boobies will not raise a hatchling which is forced by a sibling from the guano ring that forms its nest. More than siblicide or simple-mindedness, this behavior represents to Gould "inherited structural constraints [in this case, small brain size] that limit the range of specific adaptations."

Gould draws inspiration also from the great naturalists of the past, infusing new life into their findings: Steno's classifications, Hutton's cyclical theory of Earth's history, even Cuvier's creationist-based fossil chronologies.

And best of all for the new reader of evolutionary theory, Gould ranges as far afield as his hero, Joe DiMaggio, to gather in the appropriate metaphor. Gould's devoted fans, accustomed to seeing the changing shape of Mickey Mouse's head used to illustrate neoteny, will not be surprised to learn how the decrease in the size of Hershey chocolate bars contradicts the evolutionary principle of phyletic size increase. Or to find Shakespeare's plays, Gilbert and Sullivan operettas and *The Barber of Seville* quoted to support concepts of natural history.

"Small items with big implications are my bread and butter," says this self-described "oddball." The same could be said of Sherlock Holmes and all other great detectives. It is comforting to know that this shamus is cracking cases tied to the greatest mystery of them all—the development of life.
Don Lessem
Naturalist and critic

Whose Little Boy Are You?
Heywood Hale Broun
St. Martin's/Marek, $14.95

There is nothing ordinary about Heywood Hale Broun, least of all his childhood. Now a successful writer, critic and television commentator, Broun is proof of humor's indomitable sway over the detritus of one's upbringing. In this poignant memoir, it is his wit that triumphs over an altogether understandable self-pity.

His father was Heywood Campbell Broun, who started writing for newspapers in 1908 and didn't stop until he died in 1939. He wrote on sports, drama, war and injustice with an easy grace that won him an avid readership, many enemies and heroic status in the annals of journalism. He helped mightily to found the American Newspaper Guild, operated at the Algonquin Round Table and ran for Congress as a Socialist in 1930.

His mother was Ruth Hale, drama critic, press agent, reporter and feminist who went to court to retain her maiden name after marriage, and founded the Lucy Stone League to encourage other women to do the same. When Ruth Hale and Heywood Broun weren't crusading, they were exchanging memorable witticisms with Dorothy Parker, Alexander

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Small wonder that the young Broun is reported to have said that the cure for an undetermined ailment of his father was to "hit him over the head with a cocktail shaker." Paul Robeson put him to bed, John Barrymore was his mother's friend, and Eleanor Roosevelt came into the kitchen to bid him goodbye after a party. He mixed drinks, absorbed the New York literary scene, and hid his hurt with a wit etched by the acid of his surroundings.

The passion his parents had for a better world left little time for the terrors of a sickly son who became something of a professional invalid. An only child in a very adult and unsentimental household, Broun learned to feint and parry with the agility of an Olympic fencer.

The "whimsical irony" that became the "eggshell armor" of his father's vulnerability came to serve him too. He writes: "I soon learned that emotion was for big things like *causes*. My counterfeit emotion as I pounded the face of Warren Harding and called for the election of Debs was okay. . . ."

The struggle for respectable rage continues to daunt him through middle age. An understanding friend described his dilemma this way: "It's not enough for you to survive. You have to be a gentleman. You must fill big pairs of shoes, follow in footsteps, must not give way to anger because you have been given so much more than others . . . and most of all must not be allowed unhappiness because unhappiness would reflect unfavorably on those wonderful people Ruth and Heywood. Of course, you're a failure. What else could you be?"

Whose Little Boy Are You? tells us what else Heywood Broun could be. It is a painful journey of forgiveness and renewal, saved from dreariness by good sense and humor. Like most memoirs, the perceptions are distorted through a personal prism which selects the most dazzling and justifiable remembrances. It is an interior book—long on self-absorption, rather short on historical context. In the end, however, we admire the way Broun comes to terms with his famous parents and cheer his spirited response to the title's question: "You know goddamned well whose little boy I am!"

Jill D. Merrill
Washington writer and critic

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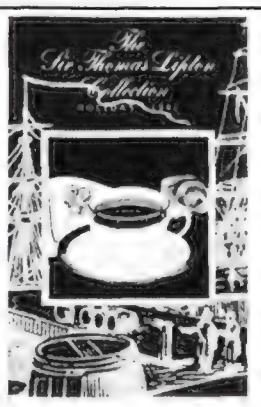

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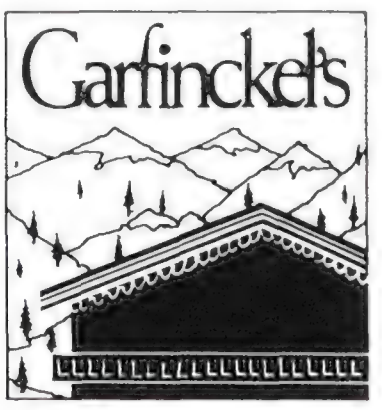

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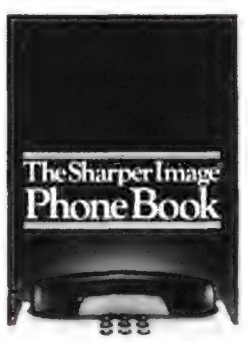

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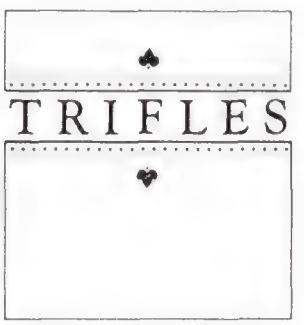

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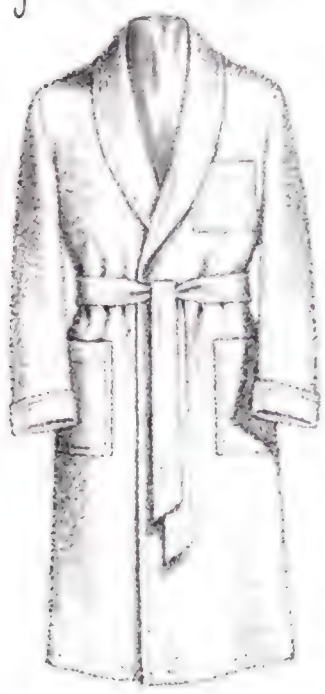

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Additional reading

Schweinfurt (p. 34)

The Army Air Forces in World War II by W. F. Craven and J. L. Cate, University of Chicago Press, 1948-58

The Mighty Eighth: A History of the U.S. 8th Army Air Force, Doubleday, 1970

Decision Over Schweinfurt by Thomas M. Coffey, David McKay, 1977

Double Strike by Edward Jablonski, Doubleday, 1974

The Schweinfurt-Regensburg Mission by Martin Middlebrook, Scribner's, 1983

The Fall of Fortresses by Elmer Bendiner, Putnam's, 1980

Rare farm animals (p. 46)

The Chance to Survive by G. L. H. Alderson, Cameron and Tayleur Ltd. (London), 1978

The Ark, Monthly Journal of the Rare Breeds Survival Trust, 4th Street, National Agricultural Centre, Kenilworth, Warwickshire CV8 2LG England

"AMBC News: Newsletter of the American Minor Breeds Conservancy," Box 225, Hardwick, Massachusetts 01037

Rare Breeds by Ralph Whitlock, Van Nostrand Reinhold, 1980

Vaux-le-Vicomte (p. 56)

Louis XIV by John B. Wolf, Norton, 1968

The Man in the Iron Mask by Alexandre Dumas, Lightyear Press (Laurel, New York), 1976

Gardens of Illusion: The Genius of André Le Nostre [Nôtre] by F. Hamilton Hazlehurst, Vanderbilt University Press, 1980

"L'Affaire Fouquet" by Daniel Dessert, *L'Histoire*, March 1981

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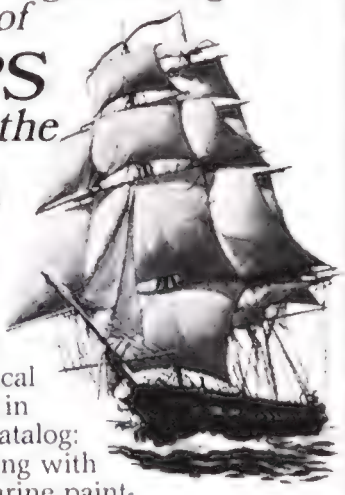

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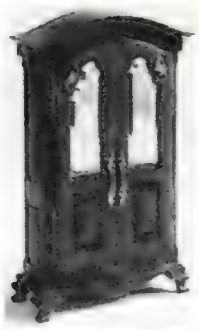

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Manteo marionettes (p. 68)

The Puppet Theatre in America: A History by Paul McPharlin, Harper, 1949

The Art of the Puppet by Bil Baird, Macmillan, 1965

"*Opera dei Pupi*" by Mark Singer, *The New Yorker*, September 17, 1979

"Marionette Furioso" by George Tichenor, *Theatre Arts Monthly*, December 1929

Insect-eating mammals (p. 74)

The Mammalian Radiations by John F. Eisenberg, University of Chicago, 1981

The Biology of the Monotremes by Mervyn Griffiths, Academic Press, 1978

Insects as Human Food by F. S. Bodenheimer, W. Junk (The Hague), 1951

East African Mammals (Vol. 3, Part A) by Jonathan Kingdon, Academic Press, 1977

Backyard artists (p. 82)

Naives and Visionaries (exhibition catalog), Walker Art Center (Minneapolis), Dutton, 1974

All Their Own: People and the Places They Build by Jan Wampler, Schenkman (Cambridge, Massachusetts), 1977

Fantastic Architecture by George R. Collins, Abrams, 1980

In Celebration of Ourselves by Seymour Rosen, California Living Books (San Francisco), 1979

Washington Irving (p. 92)

Rip Van Winkle & The Legend of Sleepy Hollow by Washington Irving, Sleepy Hollow Press (Tarrytown, New York), 1980

Diedrich Knickerbocker's A History of New-York by Washington Irving, Sleepy Hollow Press, 1981

The Life of Washington Irving by Stanley T. Williams, Oxford University Press, 1935

"Washington Irving," edited by William L. Hedges, *Major Writers of America* (Vol. 1), edited by Perry Miller, Harcourt, Brace & World, 1962

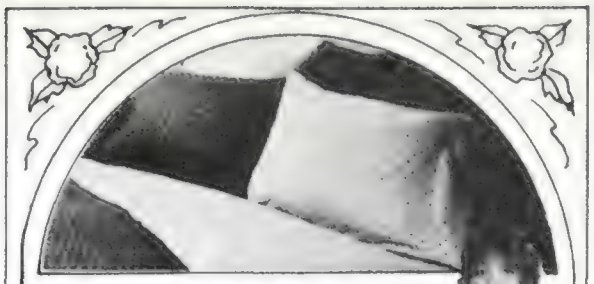
Ice ponds (p. 104)

"Enerplex, Princeton, Forrestal Center," *Architectural Record*, May 1982

Ice: The Ultimate Human Catastrophe by Fred Hoyle, Continuum Publishing (New York), 1981

Snow by Ruth Kirk, Morrow, 1977

The Curve of Binding Energy by John McPhee, Random House, 1973



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Smithsonian highlights

An elegant and nostalgic exhibition has been extended through September 5 by the National Museum of American History. *Gifts of Glass, 1885-1920* is filled with the finest examples of the vases, bowls, plates and goblets that used to grace the mantels and shelves of Great-grandmother. The items were chosen by seven U.S. glass manufacturers as representative of the period in which they were made. From the richly colored Favrile glass fashioned under the supervision of Louis Comfort Tiffany, to the subtle contrast of the Libbey cut-glass pieces, the show sparkles.

Special August exhibits and events

National Air and Space Museum
Starfires! (August 6; 9 A.M.) Monthly sky lecture.

Cooper-Hewitt Museum (New York)
Photography and Architecture: 1839-1939 (through October 16) More than 150 photographs record architectural history.
A Penny Saved: Architecture in Cast Iron Toy Banks (August 2-December 31) Nearly 100 items from turn-of-the-century era.

Freer Gallery of Art
Pre-Islamic Metalwork from the Near East (through August) Gold, silver and bronze objects prior to sixth century A.D., from Sassanian and other cultures.

National Museum of American Art
More than Land or Sky: Art from Appalachia (August 21-October 9), at Southern Ohio Museum and Cultural Center, Portsmouth, Ohio.

Renwick Gallery
Scandinavian Modern 1880-1980 (through October 10) More than 330 objects, some whimsical (see page 127).

The Washington Craft Show: Call for entries

Craftspeople are invited to apply for inclusion in the Smithsonian's second annual juried Craft Show, sponsored by the Women's Committee of the Smithsonian Associates. It will be held April 27-29, 1984, in the Departmental Auditorium in Washington, D.C. To apply, submit five color slides and a $10 fee no later than October 10, 1983, to: Women's Committee, A&I 3101, Smithsonian, Washington, D.C. 20560. For more information, write or phone (202) 357-4000. Please note that paintings, graphics, sculpture and photography, as well as crafts made from commercial kits, will not be considered.

Smithsonian events

For price information and tickets to Resident Associate events, call 357-3030:
Imrat Khan in Concert (August 17; 8 P.M.) Greatest exponent of the bass sitar performs improvisations on Indian ragas.
The Legacy of Tennessee Williams (August 4, 11, 18, 25; September 1, 15; 7:30 P.M.) Film series presents *Summer and Smoke*, other greats.
A Caribbean Gala (August 24; 8 P.M.) Drums, dance and song followed by champagne reception to celebrate Caribbean Independence Week.
Songs for a Summer Night: Hot Mustard in the Courtyard (August 31; 7 P.M.) Jazz band performs swinging renditions of tunes from 1930s musicals.
The Plutonium Story: Told by Glenn T. Seaborg (August 29, 8:30 P.M.) Eminent scientist recounts dramatic story of his 1940-41 discovery of plutonium.
Plundering History: The Traffic in Peruvian Art (August 16; 8 P.M.) Professor Richard Burger of Yale University recounts shocking episodes of theft and recapture of pre-Columbian masterpieces.

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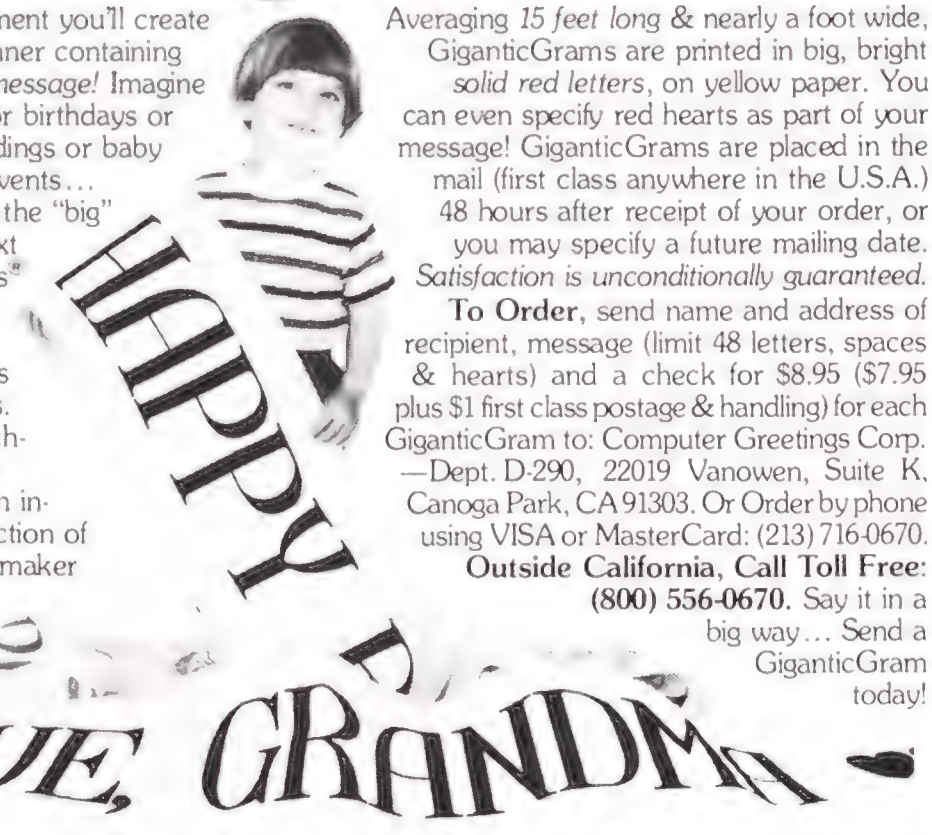

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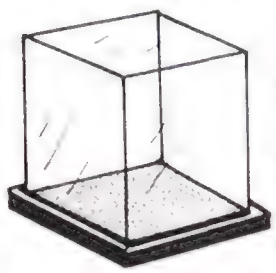

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Radio Smithsonian: August features include eyewitness accounts of the 1883 eruption of Krakatau and a review of Smithsonian Secretary S. Dillon Ripley's ornithological research.

Here at the Smithsonian: TV features include bicentennial of ballooning and highlights of the 1983 Festival of American Folklife.

To find out what stations in your area carry these programs, write: Office of Telecommunications, MNH Room C222B, Washington, D.C. 20560.

Chamber Players at San Diego

The Smithsonian Chamber Players will perform at the San Diego Bach Festival on August 29 and 30, and will give a master class on the morning of August 30. For information, contact the San Diego Bach Festival, 2111 Camino del Rio South, San Diego, California 92108.

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington. To sponsor a show in your community, write: SITES, Smithsonian, Washington, D.C. 20560. Here are some August exhibitions:

Tucson (August 20-September 18) *John Sloan in Santa Fe*, University of Arizona Museum of Art.

Grand Junction, Colorado (August 19-October 2) *Year of the Hopi*, Western Colorado Center for the Arts.

Clayton, Missouri (August 13-September 11) *The Seasonal Trade: Holiday Gift and Greeting Cards*; (August 6-September 11) *Kentucky Quilts, 1800-1900*; St. Louis County Department of Parks.

Philadelphia (August 27-October 9) *Jamaican Art: 1922-1982*, Afro-American Historical and Cultural Museum.

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Scandinavia's other face

The severely modern Scandinavian style that was the rage in the 1950s had a touch of whimsy we overlooked

An armchair in which you lean back to rest against a plumed mythical beast? Or how about a gaping, four-legged fish with a man emerging from its backbone? Produced some 80 years apart, these are two of the surprising objects in the Renwick Gallery's current exhibition, *Scandinavian Modern: 1880-1980,* that shake up our stereotype of the Scandinavian style.

For most Americans, that style—which was very much in vogue here during the 1950s—is characterized by restraint in form and reliance on natural materials. But that is only partly true. There also has long been, and continues to be, a streak of assertiveness and playfulness, as well as a strong interest in ancient Nordic history and mythology. The Viking revival armchair combines all of these features; the fish-bodied *Animal and Man,* created in 1974, is equally bold.

Scandinavian Modern, with 330 items, brings together all the currents of this complex art tradition. Along with the elegant, organic lines of Alvar Aalto, Georg Jensen and other internationally-known designers, there are many exuberant works as well. The Vikings, after all, were anything but understated.

Constance Bond

Silver and opal dragonfly brooch, 1904, was made in Denmark by Georg Jensen.

Erik Magnussen's silver grasshopper, 1907, reflects his interest in nature.

Enigmatic *Animal and Man* is by Ulrica Hydman-Vallien, a Swedish ceramist.

Gerhard Munthe designed Viking revival chair for "Fairy Tale Room" in Oslo.

Swedish wheel-cut, overlay glass bowl was made at Kosta Glasbruk in 1900.

Alvar Aalto's cased-glass bowls, 1939, form a blossoming flower when nested.

Bing & Grondahl vase, 1923, was cast in mold, then pierced, detailed by hand.

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Thailand and Burma January 20-February 10: Explore colorful cities, remote villages, and archaeological sites in Asia's most exotic countries.

India and Sri Lanka January 22-February 12: Combine a land trip to Delhi, Agra, Jaipur and Udaipur in northern India with a voyage around the Indian sub-continent on the *Illiria*. Explore the country's fascinating cultural contrasts with study leaders and local speakers.

Zapotec and Mayan Mexico February 9-21 or March 8-20: Study native cultures—past and present—in Oaxaca, San Cristóbal de las Casas and the Yucatán.

Write National Associates, A&I 1278 Smithsonian Institution, Washington, D.C. 20560 or call (202) 357-2477 for specific tour brochures

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Lost America: Myth and Reality October 2-7: Dean Snow, renowned author, archaeologist and consultant to the National Geographic Society, discusses in generously illustrated lectures important archaeological sites in the news today, including the great burial mounds, gigantic systems of geometric earthworks, and the temple builders who were inspired by Mesoamerican cultures.

World War I Aviation October 16-21: World-renowned experts Jack Bruce, Peter Grosz, Walter Boyne, Donald Lopez and others from the National Air and Space Museum shed new light on the brave pilots and the evolution of their aircraft.

Aircraft Restoration: How To October 23-27: The master craftsmen of the National Air and Space Museum share their many techniques in workshops at the Paul E. Garber Facility (Silver Hill).

American Antique Furniture October 23-28: Connoisseurship of masterpieces, 1650-1840. Includes great collectors, detection of fakes, care of antiques and tours of Winterthur Museum and the Diplomatic Rooms at the Department of State.

Quilted Clothing November 6-11: Lectures and workshops with noted designer and author Virginia Avery, who provides designs, ideas and guidance.

Irresistible Magazine Writing November 13-18: Lectures and creative workshops with Edwards Park, lively, irreverent originator of the *Smithsonian* column "Around the Mall and beyond."

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By Richard Wolkomir

Say hello to delicious new foods, like cusk and fried filet of fungus

Would you eat *Fusarium graminearum*?

Of course you would, and enjoy every bite of it, too, thrilled to be in on the New Wave of Eating. Imagine, processed filaments from a microscopic fungus, chockfull of laboratory goodness! But we New Wavers are disappointed: we want to know why the British National Enterprise Board is making this new made-from-microbes food solely in Britain? What about us over here?

We are tired of dreary old foods that have been around for years, like fried onion rings, boeuf bourguignon, apple pie with a slice of cheddar, and stuff like that. We demand Today Foods, like *Fusarium*. The manufacturer says it is the "nylon of the food trade." We want to eat nylon, too.

Maybe not nylon, exactly, but all kinds of new ingestibles. Why not? We grew up with all-new cars in the showrooms every spring. And all-new clothing styles every season. There were daring, makes-all-previous-systems-obsolete new concepts in *High Fidelity* every month. And digital wristwatches. Buy the very latest (it gave you a countdown to Arbor Day) and the next week someone had an even newer model that did Arbor Day *and* something else amazing, like, maybe, reciting Joyce Kilmer's "Trees." Then came video recorders. And up-to-the-very-second personal computers. Once accustomed to newness, we *demand* newness. Now we want new foods.

Newer, even, than the "egg substitutes" that have been at the supermarket for a decade now. Admittedly, they are "better" than plain old chicken eggs. (Who knows where that chicken has been?) But ersatz eggs are getting to be old stuff. We have said "no" to old-fashioned sausages and bacon, too. We buy "breakfast strips," synthetics crafted from soy protein, engineered for top performance on today's plastic dinnerware. They, too, are becoming antique.

That is why we are monitoring laboratory reports. Our anticipation is keen.

We are, for instance, tapping our spoons on our plates, impatient for the new "irradiated foods." Of course! This is the Atomic Age! We are bored with foods preserved with BHT and nitrates and all those weary chemicals. Space-shuttle crews already enjoy irradiated steaks, preserved by exposure to nature's own gamma rays and spotlessly clean x rays. En route to the moon, Apollo 17 astronauts ate irradiated sandwiches—ham and cheese on rye—describing them as "space culinary delights."

And *that* was back in the Dark Ages, around 1972. The U.S. Army began studying food irradiation in the 1950s. Sure, there was too much radiation at first, turning foods mushy so that they tasted, as one researcher put it, like "wet dog." But Army supercooks learned to throttle back on those kilorads. Here it is the 1980s and the safety of irradiation is still being debated. We want astronaut food *now*, and we are getting cranky.

Of course, we should be patient. We know that comestibles engineers are working late at the laboratories, passing voltages through things and peering into electron microscopes, until their eyes are red, at possible *new* things for soups and soufflés. But can't they hurry up?

It has been several years since Washington State University researchers promised us bread from powdered horsebeans. Where is our horsebean bread? And we wish Texas A&M would rush along its work on cotton-butter bread, green-bean casseroles with cottonseed topping, and cottonseed quiche. We want lots of cottonseeds to eat. We are also waiting on tiptoe to try the Department of Agriculture's carrot-passion fruit-juice beverage. And, get ready for this, kids—Rutgers University engineers have come up with a soluble plant-protein additive for soda pop. Awesome, huh?

Goodbye, charcoal-broiled sirloins, pizza with anchovies, and banana cream pie. A headline in an Agriculture Department journal says we should get ready for "High Protein Foods From Grass." Or maybe we'll go for single-cell protein, which Phillips Petroleum is developing from yeast that feeds on methanol. A thousand pounds of single-cell protein can multiply in one week into a million pounds, which is certainly a lot of single-cell protein.

And why do we have to eat food in the same old tired shapes? A geneticist has developed sweet corn with square ears "so it won't roll off the plate." Wonderful new foods are coming from the sea, too. The National Marine Fisheries Service wants us all to start eating dogfish, for instance. Also croaker and viperfish. Pigfish, too. And stumpknockers. We could devour a cusk or scup right now. Or a lizard fish. They are all swimming out there, new fish like the ratfish and the gag. We can't wait.

The people at Marine Fisheries want to know—how about you? Would you eat a grunt? It's new!

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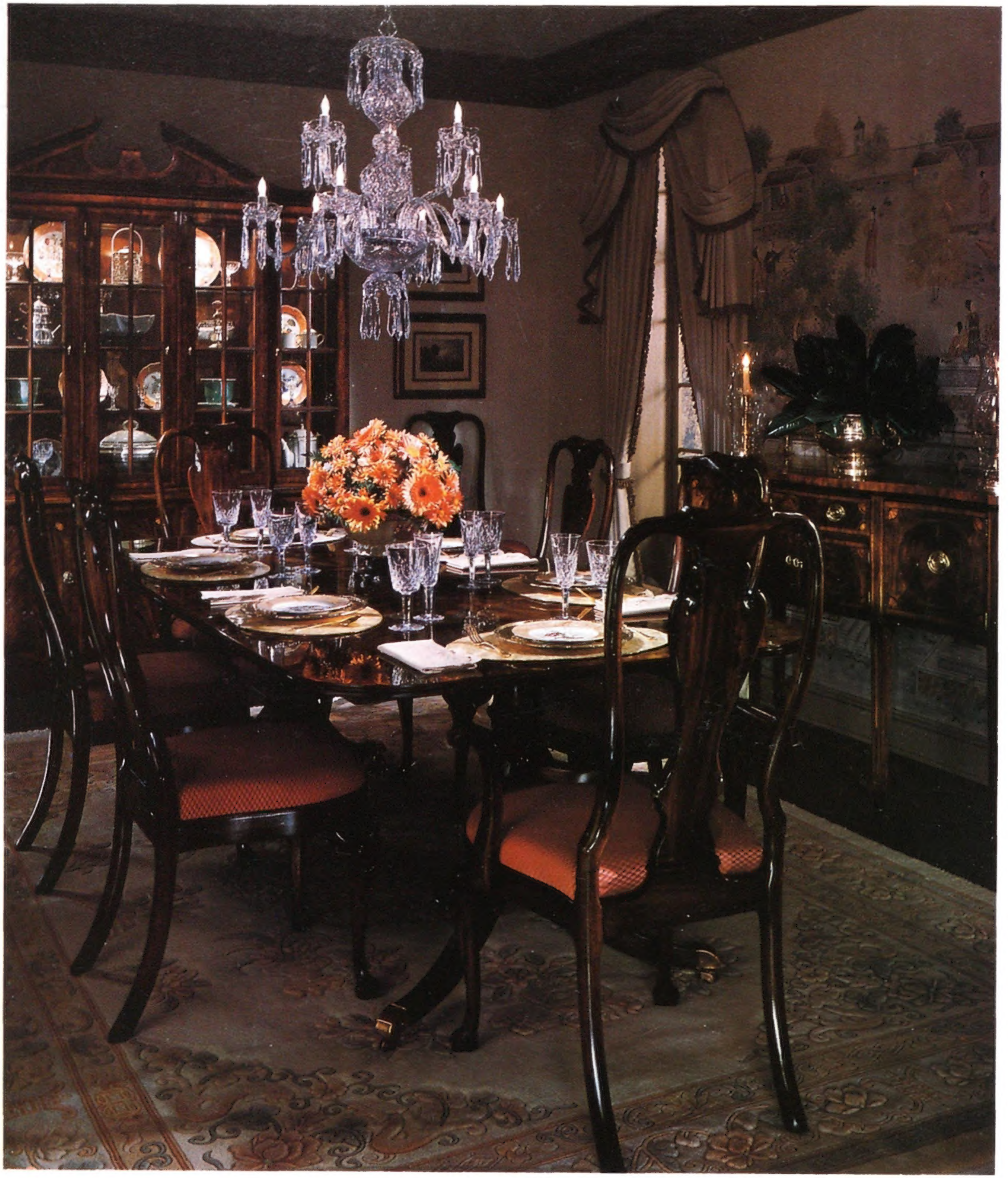

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